

MINERALOGICAL ABSTRACTS

(Vol. 8, No. 1, March, 1941.)

Notices of Books.

MILNER (Henry B.). *Sedimentary petrography. With special reference to petrographic methods of correlation of strata, petroleum technology and other economic applications of geology.* Third edition, London (Thomas Murby & Co.), 1940, xxiii+666 pp., 52 pls., 100 text-figs. Price 45s.

This third edition shows a considerable increase and improvement on the first edition of 1922 (125 pp., 16 pls.) [M.A. 2-3] and the second edition of 1929 (514 pp., 41 pls.) [M.A. 4-146], and it may now be regarded as the standard work of reference on the petrography of sediments and sedimentary rocks. In the past an unbalanced attention has been paid to the petrography of igneous rocks, but during recent years sedimentary rocks have come into their own, largely as a result of the investigation of petroleum occurrences and other economic problems, and considerable advances have been made in the subject. The book gives full details of the technique of examination employed in the author's laboratories. The characters of a large number of minerals (arranged alphabetically) that have been found as grains in sediments are enumerated, and records of occurrences especially at British localities are listed with references to the literature. Another section gives a systematic account of the different types of sedimentary rocks. The appendices give useful tables of data, and an extensive bibliography is added. Apart from a few misprints, the only criticism is the faulty drawings of crystals in the brief mention of crystallography. L. J. S.

ALLEN (Robert) & HOWLING (G. E.). *Chrome ore and chromium.* Reports on the mineral industry of the British Empire and foreign countries. Mineral Resources Dept., Imperial Institute, London, 1940, vi+118 pp. Price 2s. 6d.

The previous edition [M.A. 1-85] issued in 1920 (reprinted in 1921) by the Imperial Mineral Resources Bureau extended to only 29 pages; and a monograph 'Chromium ores' (ix+58 pp.) by W. R. Rumbold was issued by the Imperial Institute in 1921. The present issue shows a substantial increase. Very few minerals contain chromium as an essential constituent, and chromite is the only ore. During recent years chromium-steel alloys have come to be of increasing importance. Details are given

of these and of the uses of chromite as a refractory material and in the chemical industries. Full details are given of the occurrence and mining of the ore in 43 countries, with useful bibliographies for each. Statistics are given of production, exports, and imports. The largest producers (each over 100,000 tons of ore per annum) are Southern Rhodesia, Union of South Africa, Russia, and Turkey. L. J. S.

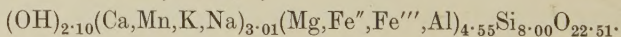
New Minerals.

[SHUBNIKOVA (O. M.)] Шубникова (О. М.). Новые минеральные виды и новые названия минералов. (1936–1937 гг.). [*New mineral species and new names of minerals. (Years 1936–37).*] Труд. Инст. Геол. Наук, Акад. Наук СССР, Вып. 11, Мин.-Геохим. Сер. no. 3 [Trans. Inst. Geol. Sci., Acad. Sci. USSR], 1938 [i.e. 1940], no. 11 (Min. Geochem. Ser., no. 3), pp. 1–36, 7 figs.

A continuation of previous lists [M.A. 6-51; 7–9, 58] giving data for the period 1936–37. L. J. S.

[EFREMOV (N. E.)] Ефремов (Н. Е.). Новый минерал абхазит. [*New mineral abkhazite.*] Труд. Инст. Геол. Наук, Акад. Наук СССР, Вып. 11, Мин.-Геохим. Сер. no. 3 [Trans. Inst. Geol. Sci., Acad. Sci. USSR], 1938 [i.e. 1940], no. 11 (Min. Geochem. Ser., no. 3), pp. 37–44.

A monoclinic amphibole-asbestos from the serpentine massif of the Adange range in province Abkhazia, Georgia, Transcaucasia, shows fibres 10–30 cm. long, sp.gr. 2.30 [?], α 1.624, γ 1.641, $\gamma:c = 16^\circ$, $2V 60^\circ$. Analysis gave: SiO₂ 50.18, Al₂O₃ 4.70, Fe₂O₃ 8.30, FeO 1.20, MnO 0.67, MgO 14.58, CaO 16.14, Na₂O 0.53, K₂O 0.87, P₂O₅ 0.76, H₂O + 1.99, H₂O – 0.77 = 100.69; formula,



The ratio (Mg,Fe):Ca is 4:3, differing from the 5:2 ratio of tremolite- and actinolite-asbestos. L. J. S.

CUIMARAENS [i.e. GUIMARAENS] (Caio Pandiá). *Djalmaita, um novo mineral radioativo*. Annaes Acad. Brasil. Sci., 1939, vol. 11, pp. 347–350, 3 figs.

This occurs as yellow octahedra with small (311) faces in pegmatites worked for aquamarine and bismuth at the fazenda da Posse, Brejaubas district, Minas Geraes. Sp.gr. 5.75–5.88, H. 5½, n 1.97. Analysis gave: Ta₂O₅ 72.77, Nb₂O₅ 1.41, TiO₂ 2.54, SnO₂ trace, ZrO₂ 0.80, UO₂ 2.17, UO₃ 9.38, WO₃ 0.18, Bi₂O₃ 0.98, PbO 1.10, FeO 0.56, MgO 0.24, CaO 3.40, H₂O 4.62 = '99.66'. It is the tantalum analogue of betafite. L. J. S.

BERMAN (Harry) & WOLFE (C. W.). *Bellingerite, a new mineral from Chuquicamata, Chile*. Amer. Min., 1940, vol. 25, pp. 505-512, 2 figs.

Minute green crystals of hydrous copper iodate occur with leightonite and gypsum in crevices in an altered granitic rock. They are triclinic-pinakoidal, goniometric measurements giving $a:b:c = 0.9264:1:1.0149$, $\alpha 105^\circ 6'$, $\beta 96^\circ 57\frac{1}{2}'$, $\gamma 92^\circ 55'$, with 28 crystal-forms; twins on $(\bar{1}01)$. Sp.gr. 4-89, H. 4. The optical orientation is determined; $\alpha 1.890$, $\beta 1.90$, $\gamma 1.99$, positive. Analysis by F. A. Gonyer, I_2O_5 77.55, CuO 18.65, H_2O 3.22 = 99.42, gives the formula $3Cu(IO_3)_2 \cdot 2H_2O$. X-ray measurements give a unit cell, $a 7.22$, $b 7.82$, $c 7.92 \text{ \AA.}$, containing one such molecule. The mineral is identical with crystals prepared by Granger and de Schulten (1904) to which they gave the formula $Cu(IO_3)_2 \cdot H_2O$.

L. J. S.

LARSEN (Esper S., 3d.) & MONTGOMERY (Arthur). *Sterrettite, a new mineral from Fairfield, Utah*. Amer. Min., 1940, vol. 25, pp. 513-518, 1 fig.

Still another hydrous basic aluminium phosphate from the variscite nodules of this locality [M.A. 4-343, 7-513]. Minute, colourless, orthorhombic crystals occurring in cavities in pseudowavellite gave $a:b:c = 0.8662:1:0.5325$, with few crystal-forms (no pyramids). X-ray measurements gave $a 8.90$, $b 10.20$, $c 5.43 \text{ \AA.}$; space-group $D_2^4 = P2_12_12_1$. The axes are polar, and striations on the faces are suggestive of twinning. Sp.gr. 2-36, H. 5, $\alpha (= a) 1.572$, $\beta (= b) 1.590$, $\gamma (= c) 1.601$, $2V 60^\circ \pm 10^\circ$, negative. Analysis by F. A. Gonyer, P_2O_5 40.10, Al_2O_3 39.07, H_2O 20.36 = 99.53, gives the formula $Al_6(PO_4)_4(OH)_6 \cdot 5H_2O$. The unit cell contains one such molecule.

L. J. S.

PEACOCK (M. A.) & DADSON (A. S.). *On rammelsbergite and pararammelsbergite: distinct forms of nickel diarsenide*. Amer. Min., 1940, vol. 25, pp. 561-577, 12 figs.

Details of a paper previously published in abstract [M.A. 7-469], together with description (by A. S. Dadson) of polished sections in reflected polarized light. A new analysis of bladed and twinned rammelsbergite from Eisleben, Thuringia, gave Ni 24.58, Co 2.86, Fe 0.03, Cu 0.56, As 70.13, Sb 0.48, Bi trace, S 0.35, gangue 1.45 = 100.44; sp.gr. 6.97; the unit cell contains $2NiAs_2$. Pararammelsbergite has been previously described with chemical analyses under the name rammelsbergite from Hudson Bay mine, Cobalt, Ontario [M.A. 1-410], Keeley mine, South Lorrain, Ontario [M.A. 3-305], and Moose Horn mine, Elk Lake,

Gowganda, Ontario [M.A. 7-507]. It is tabular in habit on (001) with perfect (001) cleavage and no twinning. The X-ray powder pattern is distinct from that of rammelsbergite. The unit cell contains 8NiAs_2 . These two modifications of NiAs_2 are both orthorhombic; the existence of a cubic modification (chloanthite) is doubted. L. J. S.

TAINTER (M. L.), KULCHAR (G.), & STOCKTON (A. B.). *Elkonite, a colloidal clay. Properties, actions and possible medicinal uses.* Journ. Amer. Pharmac. Assoc., 1940, vol. 29, pp. 306-310.

A light olive-grey to greyish, rather friable clay from Elko, Nevada, when placed in water swells up to many times its original volume to a firm jelly-like mass. It has the property of absorbing dyes, acids, and alkalis, and may be of use for gastro-intestinal disorders and as an ointment base. Analysis gave SiO_2 52.70, Al_2O_3 17.44, Fe_2O_3 1.96, MgO 3.63, CaO 0.91, Bi 0.01, As trace, $\text{H}_2\text{O} +$ 10.20, $\text{H}_2\text{O} -$ 12.83 [= 99.68]. L. J. S.

FESTER (A. G.) & CRUELLA (J.). *Broggita, nueva especie mineral.* Bol. Museo Hist. Nat. Lima, 1939, año 3, no. 8, pp. 22-23.

Reprint of an article previously published [M.A. 6-443]. L. J. S.

X-rays and Crystal-structure.

DONNAY (J. D. H.) & HARKER (David). *Nouvelles tables d'extinctions pour les 230 groupes de recouvrements cristallographiques.* Naturaliste Canadien, 1940, vol. 67, pp. 33-69.

The 230 space-groups, in Schoenflies and Hermann-Mauguin notations, are usefully grouped in 97 'aspects' each of which has a different set of general extinction conditions. The aspects and the corresponding extinction conditions are denoted by symbols based on the notation of the 'International tables' [M.A. 6-145]. Thus the aspect Pn^*a with the extinction conditions **P IPB**, with reference to (hkl) , $(0kl)$, $(h0l)$, $(hk0)$, respectively, includes the space-groups $D_{2h}^{16} = Pnma$ and $C_{2v}^9 = Pn2a$. The monoclinic aspects and space-groups are given in two orientations, orthorhombic in six orientations, tetragonal and hexagonal in two orientations. M. A. P.

EDWARDS (Olive S.), LIPSON (H.), & WILSON (A. J. C.). *Tables for facilitating the calculation of the lattice spacings of cubic crystals.* The Crystallographic Laboratory, Univ. of Cambridge, 1940, 35 pp.

Values of $\sqrt{N}\lambda/2$ where $N = h^2 + k^2 + l^2$ are tabulated for the Cu, Ni,

Co, Fe, Mn, and Cr X-ray lines $K\alpha_1$, $K\alpha_2$, and $K\beta_1$, followed by values of $\text{cosec } \theta$ and $\sin^2\theta$ tabulated at 0.01 and 0.1 degree intervals. The required spacing is obtained by multiplying together the corresponding values $\sqrt{N}\lambda/2$ and $\text{cosec } \theta_N$. Extrapolation of various values of the spacing obtained from different planes is carried out to $\sin^2\theta = 1$. Formulae are also given for correcting the spacing for the refractive index of X-rays.

F. A. B.

BERG (J. ter) & JAEGER (F. M.). *On the possibility of distinguishing right- and left-handed structures in crystals by means of their Laue-patterns.* Proc. Acad. Sci. Amsterdam, 1937, vol. 40, pp. 406-410, 1 pl.

It is commonly held that it is impossible to distinguish by X-ray methods between d - and l -optically active crystals; this is not necessarily the case for crystals of polar symmetry. Laue patterns of crystals of the classes C_1 - C_6 taken along the principal axis, of class D_3 along a two-fold axis, and of classes T and O along a three-fold axis show no lines of symmetry, and if the corresponding ends of the polar axis in two crystals are known, Laue photographs will show whether they are of opposite configuration or no. Habit, pyro- or piezoelectric tests will often disclose the polarity of the polar axis. The method may be used to decide which antipodes of a pair of optically active isomorphous substances have the same configuration, and is applied to three complex salts of Co, Cr, and Rh.

M. H. H.

OLDHAM (J. W. H.) & UBBELOHDE (A. R.). *Melting and crystal structure.* Proc. Roy. Soc. London, Ser. A, 1940, vol. 176, pp. 50-75, 11 figs.

A picture of melting is suggested in which a network of co-operative flaws breaks up the crystal into a mosaic, or aggregate of crystalline micelles, and in which the solid-liquid transition is comparable with a gel-sol transition.

F. A. B.

HEIDE (F.). *Die natürlichen Silberamalgame.* Naturwiss., 1937, vol. 25, pp. 651-652.

Of the three phases, α , β , and γ , known in the Ag-Hg system, the α and γ phases were represented by the natural amalgams studied. The α -phase included specimens from pure silver to 50.6 % Ag, and the cell-side increased linearly with Hg content up to 4.176 Å. for this specimen (from Stahlberg in the Palatinate). The γ -phase has 52 atoms in the unit cell, contains 27-30 % Ag, and has a 10.015 Å., d_4^{16} 13.78. [M.A. 7-224.]

M. H. H.

PEACOCK (M. A.). *On dyscrasite and antimonial silver*. Univ. Toronto Studies, Geol. Ser., 1940, no. 44, pp. 31-46, 16 figs.

A rough crystal (sp.gr. 9.74) from Andreasberg, Harz, is a pseudo-hexagonal bipyramid with $e(021)$ and/or $p(111)$, twinned on (110) ; cleavages (001) and (011) ($a:b:c = 0.5722:1.0.9225$, from X-ray measurements). The unit cell is orthorhombic with space-group $C_{2v}^1 = Pm2m$ and a 2.990, b 5.225, c 4.820 Å.; it contains Ag_3Sb , nearly in hexagonal close-packing [M.A. 3-524]. The X-ray powder pattern is reproduced and indexed, the generally diffused lines being due to pseudosymmetry. Antimonial silver (Sb 6.78 %) from the Temiskaming mine, Cobalt, Ontario, is nearly cubic, with a 4.111 Å. Specimens of 'dyscrasite' from Cobalt are intergrowths of antimonial silver and dyscrasite, as shown by polished sections and X-ray powder photographs. M. A. P.

SIDHU (Surain S.) & HICKS (Victor). *The space lattice and "superlattice" of pyrrhotite*. Physical Rev. (Amer. Physical Soc.), 1937, ser. 2, vol. 52, p. 667.

Superlattice lines were observed on X-ray powder photographs of para- and ferro-magnetic natural (Kisbánya, Romania, and Rossland, British Columbia) and artificial specimens of pyrrhotine, but not on single-crystal rotation photographs of ferro-magnetic pyrrhotine from Minas Geraes or paramagnetic from Maggadione, Italy. M. H. H.

HICKS (Victor) & SIDHU (S. S.). *Space group of pyrrhotite*. Physical Rev. (Amer. Physical Soc.), 1938, ser. 2, vol. 53, pp. 207-208.

Pyrrhotine of d 4.55 has a hexagonal lattice of dimensions a 3.453, c 5.670 Å., the unit cell containing approximately two molecules; probable space-group D_{6h}^4 . [M.A. 5-310, 466.] L. J. S.

BERRY (L. G.). *Studies of mineral sulpho-salts: III—boulangerite and "epiboulangerite"*. Univ. Toronto Studies, Geol. Ser., 1940, no. 44, pp. 5-19, 14 figs.

The diagnostic X-ray powder pattern of boulangerite (reproduced and indexed) is given by acicular or fibrous material from Gold Hunter mine, Mullan, Idaho (Shannon's analysed 'mullanite' = boulangerite [Min. Mag. 18-384]); Independence mine, Wood River district, Idaho; Iron Mountain mine, Superior, Montana; Rocker Gulch placer claim, near Deer Lodge, Montana ('geocronite'); Cleveland mine, Stevens Co., Washington; Oberlahr, Prussia; Altenberg, Silesia ('epiboulangerite'); Příbram, Bohemia; Oruro, Bolivia. The same pattern is given by many

specimens mis-labelled 'jamesonite'. Needles (sp.gr. 6.14-6.32) from Mullan are monoclinic; space-group $C_{2h}^5 = P2_1/a$. The unit cell has a 21.52, b 23.46, c 8.07 Å., β 79° 12', and contains $Pb_{40}Sb_{32}S_{88} = 8[5PbS.2Sb_2S_3]$ (from 21 analyses). Hiller's results [M.A. 7-231] are not confirmed.

M. A. P.

TAYLOR (E. D.). *Stephanite morphology*. Amer. Min., 1940, vol. 25, pp. 327-337, 3 figs.

A gnomonic projection of the known forms exhibited by crystals of stephanite with a knowledge of their relative frequency and size leads to the space-group being uniquely determined as $C_{2v}^{12} = Cmc2$. The cell sides of a twinned crystal from Ste Croix aux Mines, Alsace, have also been determined, a 7.70, b 12.32, c 8.48 $\pm$ 0.05 Å., and space-group from Weissenberg photographs confirms the above result.

F. A. B.

PEACOCK (M. A.) & BERRY (L. G.). *Röntgenographic observations on ore minerals*. Univ. Toronto Studies, Geol. Ser., 1940, no. 44, pp. 47-69.

X-ray data have been determined (in collaboration with V. B. Meen and others) for 30 species in connexion with the preparation of a new edition of Dana's 'System of mineralogy'. It was found that in several cases the material examined had been incorrectly labelled in collections. Some of the data have already been published [Min. Mag. 25-557, 597; M.A. 7-469, 507; M.A. 8-3, 6]. Baumhauerite from Binn, Switzerland, has a monoclinic unit cell with a 22.69, b 8.29, c 7.86 Å., β 83° 15', containing $Pb_{12}As_{16}S_{36} = 4[3PbS.2As_2S_3]$. The same powder pattern is given by 'guitermanite' from Zuñi mine, Silverton, Colorado. Cobaltite (Co,Fe,Ni)AsS from Håkansboda, Vestmanland, Sweden, has a 5.551 Å.; Tunaberg, Sweden, a 5.574 Å.; Columbus claim, Cobalt, Ontario, a 5.577 Å. Corynite from Carinthia gives a 5.724 Å. Gersdorffite (Ni,Co,Fe)AsS from Sudbury, Ontario, gives a 5.593 Å.; Garson mine, Sudbury, a 5.645 Å.; Crean Hill, Sudbury, a 5.655 Å. Jordanite (sp.gr. 6.44) from Binn, Switzerland, is monoclinic with space-group $C_{2h}^2 = P2_1/m$; the unit cell with a 8.89, b 31.65, c 8.40 Å., β 61° 39', contains $Pb_{27}As_{14}S_{48} = 27PbS.7As_2S_3$ [M.A. 7-387]. The same powder pattern is given by jordanite from Beuthen, Upper Silesia, and a specimen labelled 'boulangerite' from Sala, Sweden. Kallilite from Obersdorf, Siegen, Germany, gives a 5.915 Å. Mamillary limonite from Easton, Pennsylvania, and liver-brown limonite from Steeprock lake, Atikokan, Ontario, give a distinctive powder pattern suggesting a definite mineral. A lead-grey prismatic mineral with metallic lustre and perfect longitudinal cleavage from Anglesea township, Lennox and Addington Co., Ontario, gives the

powder pattern of meneghinite from Bottino, Tuscany. Rathite from Binn, Switzerland, is monoclinic with space group $C_{2h}^5 = P2_1/n$; the unit cell with a 25.00, b 7.91, c 8.42 Å., β 81° 0', contains $Pb_{13}As_{18}S_{40} = 13PbS \cdot 9As_2S_3$, or $Pb_{14}As_{18}S_{40}$ or $Pb_{14}As_{18}S_{41}$. Sartorite from Binn is pseudo-orthorhombic; a pseudo-cell with space-group $D_2^4 = P2_12_12_1$, a 19.48, b 4.15, c 7.86 Å., contains $Pb_4As_8S_{16} = 4[PbS \cdot As_2S_3]$; the unit cell has $a' = 4a$, $b' = 20b$, $c' = c$ [Min. Mag. 25-264]. Skutterudite (sp.gr. 6-65) from Temiskaming mine, Cobalt, Ontario, has a cubic cell with a 8.18 Å., containing $(Co, Fe, Ni)_{9.1}(As, S)_{22.8} = 8[RA_s_3]$, with nearly 1R in place of As. Almost the same powder pattern is given by smaltite from several localities and chloanthite. These are regarded as varieties of skutterudite with varying proportions of R-atoms in As-positions [M.A. 3-525]. Artificial tellurbismuth (rather than tellurobismuthite or telluro-bismutite, and giving an X-ray powder pattern distinct from that of tetradymite) has a rhombohedral unit cell with a 10.44 Å., α 24° 11½', containing Bi_2Te_3 ; space-group $D_{3d}^5 = R\bar{3}m$. Ullmannite from Salchendorf, Siegen, Germany, gives a 5.899 Å.; Monte Narba, Sardinia, a 5.905 Å. 'Weibullite', 'galenobismutite', 'seleniferous galenobismutite', 'seleniferous chiviatite' from Falun, Sweden, are intergrowths of an unidentified, fibrous to columnar, monoclinic, metallic mineral with a 18.03, b 4.04, c 17.53 Å., β 85° 31', space-group $D_{2h}^1 = P2/m$; and an undetermined, platy, hexagonal, metallic mineral, with a 4.20, c 13.22 Å., cleavage (0001). Willyamite from Broken Hill, New South Wales, gives a 5.918 Å.

M. A. P.

MENZER (G.). *Die Raumgruppe des Kryoliths Na_3AlF_6* . Naturwiss., 1938, vol. 26, p. 236.

The space-group of cryolite is C_{2h}^5 , and contains $2Na_3AlF_6$. [M.A. 7-232.]

M. H. H.

ROGERS (M. T.) & HELMHOLZ (L.). *A redetermination of the parameters in ammonium bifluoride*. Journ. Amer. Chem. Soc., 1940, vol. 62, pp. 1533-1536, 2 figs.

Revised cell dimensions of orthorhombic NH_4HF_2 are a 8.426, b 8.180, c 3.69 Å., and the parameters have been redetermined. The space-group and structure given by L. Pauling [M.A. 5-467] are confirmed.

L. J. S.

SELJAKOV (N.). *To what class of symmetry does ordinary ice belong?* Compt. Rend. (Doklady) Acad. Sci. URSS, 1936, new ser., vol. 1 (of 1936), pp. 293-294, 1 fig.

— *The nature of ordinary ice.* Ibid., 1937, new ser., vol. 14, pp. 183–186, 1 fig.

Ordinary ice exists in two modifications, with the same unit cell content (4 mols.) and approximately the same cell-size (a 4.52, c 7.34 Å.), but differing in symmetry and giving very distinct Laue patterns. The stable α -form belongs to one of the classes D_{6h} , D_6 , C_{6v} , or D_{3h} ; the unstable β -form, which inverts to the α -form when pressed or ground, belongs to C_3 or C_{3i} . Owing to confusion of the two species the structures so far suggested for ice require re-examination. The β -form is usually obtained under conditions of marked supercooling. M. H. H.

GLEMSEK (Oskar) & GWINNER (Erich). *Über eine neue, ferromagnetische Modifikation des Eisen(III)oxyds.* Naturwiss., 1938, vol. 26, p. 739; Zeits. Anorg. Chem., 1939, vol. 240, pp. 161–166.

By oxidation of an alkaline suspension of $\text{Fe}(\text{OH})_2$ a new ferromagnetic phase, $\delta\text{-Fe}_2\text{O}_3$, is formed, having a 5.09, c 4.41 Å., hexagonal, sp.gr. 4.7 (calc. for 2 mols. per unit cell, 5.32). At 110° C. it is converted into haematite in three hours. [M.A. 7-491.] M. H. H.

SEIFERT (H.). *Über die Orientierung von Oxydationsschichten auf Zinkblendekristallen.* Zeits. Krist., 1940, vol. 102, pp. 183–192, 7 figs.

When blende is carefully heated to a red glow in air, a thin film of zinc oxide is formed on the surface. The c -axis of the oxide is normal to the tetrahedral faces of the blende, and the a -direction of the oxide is parallel to a [110] direction of the blende. An explanation of this phenomenon by crystal-structure theory is given. [M.A. 6-330, 7-230.] H. S.

SILLÉN (Lars Gunnar). *Die Kristallstruktur des monoklinen $\alpha\text{-Bi}_2\text{O}_3$.* Naturwiss., 1940, vol. 28, pp. 206–207, 1 fig.

Previously thought to be orthorhombic, $\alpha\text{-Bi}_2\text{O}_3$ is monoclinic with a 5.83, b 8.14, c 7.48 Å., β 67.07° [M.A. 7-234], but a base-centred cell is pseudo-orthorhombic with a 5.83, b 8.14, c' 13.78 Å. The preparation of larger crystals enabled the space-group $C_{2h}^5 = P2_1/c$ and the positions of the atoms to be determined. L. J. S.

FERRARI (Adolfo) & COLLA (Cesarina). *Soluzioni solide fra carbonati neutri romboedrici di metalli bivalenti. Nota 1.* Gazz. Chim. Ital., 1936, vol. 66, pp. 571–580, 6 figs.

MgCO_3 , CoCO_3 , and ZnCO_3 have the same cell-dimensions and are completely miscible; ZnCO_3 , CoCO_3 , and FeCO_3 are probably miscible;

CoCO_3 and MnCO_3 , CoCO_3 and CdCO_3 , ZnCO_3 and MgCO_3 , ZnCO_3 and CdCO_3 are all completely miscible pairs in which cell-dimensions and composition show a linear relation. But CaCO_3 is not completely miscible with CoCO_3 or ZnCO_3 .

M. H. H.

HERITSCH (Haymo). *Gitterkonstanten und Raumgruppe des Artinites*. Zentr. Min., Abt. A, 1940, pp. 25-31.

Further examination of artinite [M.A. 7-392] shows that the a -axis must be doubled, and the data are now given as a 16.66, b 3.14, c 6.20 Å., β $80^\circ 15'$, with two molecules $\text{Mg}_2(\text{OH})_2\text{CO}_3 \cdot 3\text{H}_2\text{O}$. Space-group probably C_{2h}^3 , but pyroelectricity could not be detected.

L. J. S.

NESS (Ilse). *Zum Gitterbau des monoklinen $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ (Eisenvitriol, Melanterit)*. Naturwiss., 1940, vol. 28, p. 78, 1 fig.

The unit cell containing $8[\text{FeSO}_4 \cdot 7\text{H}_2\text{O}]$ measures a 15.33, b 6.50, c 20.08 Å., with β $75^\circ 44\frac{1}{2}'$ (assumed from goniometry). The space-group is probably $C_{2h}^5 = P2_1/c$. The pseudo-rhombohedral character of the lattice is commented on.

F. A. B.

KLUG (Harold P.) & ALEXANDER (Leroy). *Crystal-chemical studies of the alums. I. Solid solutions of potassium aluminum alum and ammonium aluminum alum*. Journ. Amer. Chem. Soc., 1940, vol. 62, pp. 1492-1493, 1 fig.

The lattice constant of K-Al-alum is a 12.133 Å., and for Am-Al-alum a 12.214 Å. Mixed crystals gave values differing only very slightly from Vegard's law of additivity.

L. J. S.

LAURO (Carlo). *Ricerche röntgenografiche sulla bloedite*. Periodico Min. Roma, 1940, vol. 11, pp. 39-94, 2 pls., 1 text-fig.

Bloedite from monte Sambuco, Sicily [M.A. 1-169] gave a unit cell, a 11.04, b 8.15, c 5.49 Å., β $79^\circ 21'$, containing two molecules $\text{Na}_2\text{SO}_4 \cdot \text{MgSO}_4 \cdot 4\text{H}_2\text{O}$; space-group $C_{2h}^5 = P2_1/a$.

L. J. S.

BALE (William Freer). *A comparative Roentgen-ray diffraction study of several natural apatites and the apatite-like constituent of bone and tooth substance*. Amer. Journ. Roentgenology and Radium Therapy, 1940, vol. 43, pp. 735-747, 5 figs.

Náray-Szabó's crystal-structure of fluorapatite [M.A. 4-462] is confirmed and slightly different parameter values give calculated diffraction intensities in closer agreement with powder data. The unit-cell dimensions of bone, tooth enamel, hydroxylapatite, oxyapatite, ignited bone, and tricalcium phosphate hydrate are identical, with a 9.47, c 6.88 Å.;

the dimensions for fluorapatite being a 9.37, c 6.88 Å. The differences in the powder patterns of fluorapatite and other apatite-like materials are considered to be due only to the difference of the a dimensions. The constituent of bone and tooth responsible for the diffraction patterns has the same crystal-structure as hydroxylapatite and the carbonate present in bone and tooth is neither calcite nor carbonate-apatite, but is included in imperfectly crystallized material at the boundaries of the hydroxylapatite crystallites.

F. A. B.

RICHMOND (Wallace E.). *Crystal chemistry of the phosphates, arsenates and vanadates of the type $A_2XO_4(Z)$* . Amer. Min., 1940, vol. 25, pp. 441-479, 24 figs.

A chemical and crystallographic classification of phosphates, arsenates, and vanadates of the types $A_2XO_4(Z)$ and $ABXO_4(Z)$, including data on many minerals which have not previously been examined by X-ray methods. The unit cell of higginsite containing $4[\text{CuCaAsO}_4(\text{OH})]$ with space-group $D_{2h}^5 = Pmam$ has dimensions a 7.42, b 9.20, c 5.85 Å. [M.A. 7-495]. Austinite, $4[\text{CaZnAsO}_4(\text{OH})]$, $D_{2h}^4 = P2_12_12_1$, a 7.43, b 9.00, c 5.90 Å. Duftite, $4[\text{CuPbAsO}_4(\text{OH})]$, $D_{2h}^6 = Pnan$, a 7.50, b 9.12, c 5.90 Å. Pyrobelonite, $4[(\text{Mn}, \text{Pb})_2\text{VO}_4(\text{OH})]$, $D_{2h}^{16} = Pnam$, a 7.84, b 9.45, c 6.09 Å. [M.A. 7-495]. Sarkinite, $8[\text{Mn}_2\text{AsO}_4(\text{OH})]$, $C_{2h}^5 = C2_1/a$, a 12.71, b 6.78, c 10.20 Å., β 71° 42' [M.A. 7-396]. Triplite, $8[(\text{Mn}, \text{Fe})_2\text{PO}_4(\text{OH})]$, $C_{2h}^5 = P2_1/a$, a 12.03, b 6.46, c 10.03 Å., β 74° 18'. Triplodite, $16[(\text{Mn}, \text{Fe})_2\text{PO}_4(\text{OH})]$, $C_{2h}^5 = P2_1/a$, a 12.24, b 13.35, c 9.88 Å., β 71° 58' [M.A. 7-395, 396]. Wagnerite from Werfen, Salzburg, specific gravity 3.153, yielded P_2O_5 40.18, MgO 47.56, FeO 4.32, CaO 2.53, F 9.51, less O 4.00 = 100.10; unit cell contains $(\text{Mg}, \text{Fe})_{32}(\text{Ca}, \text{P}_{15})\text{O}_{64}\text{F}_{13}$, $C_{2h}^5 = P2_1/a$, a 11.93, b 12.47, c 9.44 Å., β 71° 51' [M.A. 7-396]. Amblygonite, $2[(\text{Li}, \text{Na})\text{AlPO}_4(\text{F}, \text{OH})]$, $C_1^1 = P\bar{1}$, a 4.92, b 7.05, c 4.93 Å., α 107° 22', β 97° 27', γ 109° 50'. Axial ratios calculated from the unit-cell edges and angles of amblygonite are more accurate than those derived by J. D. Dana from approximate goniometric data. Crystals of olivenite from Tintic, Utah, are hemimorphic, but no disphenoidal forms were found to support the redetermined space-group $D_{2h}^4 = P2_12_12_1$. Cell-side measurements, a 8.16, b 8.54, c 5.86 Å. are, however, close to those of Heritsch with a and b interchanged [M.A. 7-237].

F. A. B.

BEINTEMA (J.). *On the crystal-structure of magnesium- and nickel antimonate*. Proc. Acad. Sci. Amsterdam, 1936, vol. 39, pp. 241-252, 3 figs.

Magnesium and nickel antimonates $[\text{Mg}(\text{or Ni})(\text{H}_2\text{O})_6]_2[\text{Sb}(\text{OH})_6]_2$, crystallize in class D_{3d}^1 with 6 mols. per unit cell of a 16.02, c 9.77 Å. for

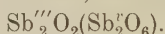
the Mg, and a 16.08, c 9.84 Å. for the Ni salt; the structure has been determined. M. H. H.

BACCAREDDA (Mario). *Piroantimoniati di metalli bivalenti: $\text{Ca}_2\text{Sb}_2\text{O}_7$, $\text{Cd}_2\text{Sb}_2\text{O}_7$, $\text{Pb}_2\text{Sb}_2\text{O}_7$* . Gazz. Chim. Ital., 1936, vol. 66, pp. 539-543.

X-ray powder photographs of $\text{Ca}_2\text{Sb}_2\text{O}_7$, $\text{Cd}_2\text{Sb}_2\text{O}_7$, and $\text{Pb}_2\text{Sb}_2\text{O}_7$ indicate a cubic structure, space group O_h^7 , cell sides a 10.30, 10.16, 10.68 Å. respectively; the observed densities are considerably lower than those calculated on a basis of 8 mols. per unit cell. Photographs of atopite and romeite are very similar to those of $\text{Ca}_2\text{Sb}_2\text{O}_7$, but the cell side is smaller (10.26 Å.) and extra lines are present; bindheimite also gives a powder photograph very similar to that of $\text{Pb}_2\text{Sb}_2\text{O}_7$, but has a smaller cell (10.42 Å.). M. H. H.

HÄGELE (Gustav). *Röntgenographische Untersuchung des Bindheimits von Waitschach bei Hüttenberg, Kärnten*. Zentralbl. Min., Abt. A, 1937, pp. 45-50.

The unit cell a 10.41 and structure O_h^7 show a relation to calcium (atopite) and lead pyroantimonates, and suggest the formula



[M.A. 4-277, 5-294, 7-235.]

L. J. S.

TAZAKI (Hideo). *Twin lamellae of boric acid BO_3H_3* . Journ. Sci. Hiroshima Univ., Ser. A, 1939, vol. 9, pp. 21-27, 2 pls., 6 text-figs.

Lauegrams of platy (on (001)) crystals of boric acid show single spots of simple crystals or double spots indicating twinning on [230], [010], or $[4\bar{1}0]$ with (001) as the combination-plane. Some crystals show lamellae due to twinning of two of these types. Examined by the convergent X-ray method they also show a fibrous structure parallel to the twin-axes. L. J. S.

DONNAY (J. D. H.) & TAYLOR (E. D.). *Les macles de la sassoline*. Naturaliste Canadien, 1940, vol. 67, pp. 145-154, 1 fig.

In a triclinic crystal twinned by rotation about an axis the composition surface is in general a non-reticular plane (rhombic section) whose irrational indices may be computed from the lattice elements. Twins of natural boric acid, by rotation about the axes [230], [010], $[4\bar{1}0]$, with the composition plane (001) in each case, have recently been described [preceding abstract]. Owing to the special nature of the structural cell ($a = b$, γ 120°) [M.A. 6-43], the computed indices of the composition plane are (001) in each case. Haushofer's geometrical elements, trans-

formed to the structural setting, $a:b:c = 0.9990:1:0.9228$; $\alpha 92^\circ 30'$, $\beta 101^\circ 10'$, $\gamma 119^\circ 51'$, give calculated indices near (001) for the composition plane in each law.

M. A. P.

HELMHOLZ (Lindsay) & ROGERS (M. T.). *The crystal structure of potassium fluoroiodate, KIO_2F_2* . Journ. Amer. Chem. Soc., 1940, vol. 62, pp. 1537-1542, 3 figs.

The unit cell of dimensions a 8.38, b 5.97, c 8.41 Å. contains four molecules; space-group $C_{2v}^5 = Pca$. Details of the structure are given.

L. J. S.

HENDRICKS (Sterling B.). *Variable structures and continuous scattering of X-rays from layer silicate lattices*. Physical Rev. (Amer. Phys. Soc.), 1940, ser. 2, vol. 57, pp. 448-454, 3 figs.

The author has previously suggested that silicates with layer structures may depart from simple periodicity along the normal to the layers as a result of translation of some layers along the [010] axis by $nb/3$ where n is an integer [M.A. 7-397, 422, 496]. He now defines four degrees of irregularity in layer lattice silicates: (1) no irregularity, (2) most elements of the crystal mosaic possess a few irregular layers, (3) some elements have a regular sequence of layers while others of the same crystal mosaic have many irregular layers, (4) all elements of the crystal mosaic have many irregular layers which lead to a small pseudo-unit of structure.

F. A. B.

CHAO (S. H.) & TAYLOR (W. H.). *Isomorphous replacement and superlattice structures in the plagioclase feldspars*. Proc. Roy. Soc. London, Ser. A, 1940, vol. 176, pp. 76-87, 3 figs.

X-ray measurements of nine plagioclase feldspars from known localities and of known composition and optical properties are given. Three, one albite and two oligoclases, with 5.2, 9.5, and 21.8 % An, represent an isomorphous series with the albite structure based upon a triclinic unit cell a 8.11, b 12.85, c 7.16 Å. (interaxial angles not determined). Two, anorthite and bytownite respectively with 0.3 and 19.8 % Ab, represent an isomorphous series with unit cell a 8.17, b 12.9, c 14.2 Å. Three intermediate plagioclases, two labradorites and one bytownite with 55, 57.1, and 67.2 % An, represent structures with cell dimensions a 8.17, b 12.9, c $n \times 7.1$ Å. where n is 5 for the first two specimens and 7 for the bytownite. These preliminary data show that n increases with Ca content for the intermediate plagioclases, but the exact limits within which the more complex structures are found are not yet known. A model for the inter-

mediate plagioclases is suggested (from the analogy of 'ghosts' given by a 'modulated' line diffraction grating) in which sheets of albite structure only a few unit cells thick alternate with sheets of anorthite structure. This model explains the X-ray photographs, but no explanation has yet been found of the absence of plagioclase structure with n even as well as odd.

F. A. B.

ROOKSBY (H. P.) & PARTRIDGE (J. H.). *An X-ray study of natural and artificial mullites*. Trans. Soc. Glass Techn. Sheffield, 1939, vol. 23, pp. 338-346, 2 pls.

The results of Posnjak and Grieg conflict with those of Bradley and Roussin [M.A. 5-323, 473] chiefly owing to the low angle diffractions and molybdenum radiation employed by the first two authors. It is agreed, however, that the name 'porzite' is misleading. The use of Cu- $K\alpha$ radiation and high-angle diffractions indicates that three varieties of mullite can be distinguished from each other and from fibrolite. These are α -mullite, SiO_2 28.2, Al_2O_3 71.8 %, corresponding to the formula $3\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$, not found naturally; β -mullite, SiO_2 22.0, Al_2O_3 77.6 %, corresponding to $2\text{Al}_2\text{O}_3 \cdot \text{SiO}_2$, and giving a pattern close to that of natural mullite from North America; and γ -mullite containing small amounts of titania and/or iron oxide in solution, giving a pattern close to that for mullite from the Isle of Mull. Only 1 % of titania is necessary to change α - to γ -mullite. Small percentages of titania or iron oxide effect a small change of axial ratios, whereas larger additions expand the lattice without further change of axial ratios. The latter effect can be observed for low-order X-ray diffractions (cf. Posnjak and Grieg), the former only with high-order diffractions. No compounds intermediate between fibrolite and α -mullite have been observed, but there is no discontinuity in the series α - to β -mullite.

F. A. B.

SPANGENBERG (K.). *Die hydroxydischen Nickel- und Magnesiasilikat-Mineralien*. Naturwiss., 1938, vol. 26, pp. 578-579.

Pimelite, $3(\text{Ni}, \text{Mg})\text{O} \cdot 4\text{SiO}_2 \cdot \text{H}_2\text{O} + x\text{H}_2\text{O}$ contains much zeolitic water and shows lattice shrinkage like montmorillonite; the layer spacing falls on dehydration from 12.8 Å. to 9.6 Å. when $x = 0.3$ and the X-ray diffraction pattern is then exactly similar to that of talc. Biaxial, 2V 30-80°, negative, γ' 1.592-1.615, $\gamma - \alpha$ 0.014-0.018. Dehydration has little effect in the optical properties. Garnierite, $3(\text{Ni}, \text{Mg})\text{O} \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O}$, has an X-ray diffraction pattern similar to that of chrysotile; 2V very small to zero, positive, α 1.622, γ 1.630, in a nickel-rich specimen. Schuchardite includes as nickel-rich members nepouite, röttisite, and connarite;

and the iron-rich revdinskite belongs to the chlorite group, has 2V small to zero, negative, $\gamma - \alpha$ 0.018–0.035, γ' 1.572–1.639, both increasing with Ni content, and is pleochroic.

M. H. H.

SANERO (Edoardo). *La struttura della xantofyllite*. Periodico Min. Roma, 1940, vol. 11, pp. 53–77, 5 pls.

Green crystals (1 cm. across) of xanthophyllite from the contact of dolomitic limestone with tonolitic diorite at Vacca lake, Adamello, have 2E 29° 50', negative, in the plane (010), and gave on analysis: SiO₂ 17.11, TiO₂ trace, Al₂O₃ 41.71, Fe₂O₃ 0.80, FeO 0.94, MnO 0.03, MgO 21.03, CaO 13.17, BaO trace, Na₂O 0.89, K₂O 0.12, H₂O + 4.03 = 99.83; sp.gr. 3.075. The unit cell, a 5.21, b 9.02, c 9.97 Å., β 79° 57' ($a:b:c$ = 0.5776:1:1.1057) contains two molecules (Mg,Ca,Al)₄(Si,Al)₄O₁₀(OH)₂; space-group $C_{2h}^3 = C2/m$.

L. J. S.

BRASSEUR (H.). *Sur la kasolite*. Bull. Cl. Sci. Acad. Roy. Belgique, 1939, ser. 5, vol. 25, pp. 654–659.

Goniometric measurements of kasolite give $a:b:c$ = 1.878:1.0966, β 76° 20', in good agreement with the axial ratios calculated from dimensions of the unit cell a 13.22, b 7.04, c 6.81 Å. containing 4[PbUSiO₆.H₂O]; calculated sp.gr. 6.256. [M.A. 6–429.]

F. A. B.

BEEVERS (C. A.) & HUGHES (W.). *Crystal structure of Rochelle salt*. Nature, London, 1940, vol. 146, p. 96.

The unit cell $11.93 \times 14.30 \times 6.17$ Å. contains four molecules



space-group $P2_12_12$. Approximate positions are given of the atoms.

L. J. S.

Rock-forming Minerals and Petrology.

EMMONS (R. C.) & GATES (R. M.). *New method for the determination of feldspar twins*. Amer. Min., 1939, vol. 24, pp. 577–589, 8 figs.

Details are given of a relatively speedy and accurate method of feldspar-twin determination using a five-axis Fedorov stage. The method is illustrated for thin sections of plagioclases.

F. A. B.

DOUGLAS (D. J.). *Reliable and rapid method for distinguishing quartz and untwinned feldspar with the universal stage*. Amer. Min., 1940, vol. 25, pp. 286–296, 6 figs.

A rapid method of distinguishing quartz from untwinned oligoclase-andesine by the universal stage is detailed. The determination of a hundred clear grains can be made in half an hour.

F. A. B.

KLEIN (Ira). *Microcline in the native copper deposits of Michigan*. Amer. Min., 1939, vol. 24, pp. 643-650, 2 figs.

Red microcline from the copper mines of Michigan contains 14.98 % K_2O and only 0.17 % Na_2O , and is characterized by an adularia-like habit and by intercrossed and interpenetrant twinning on the albite law.

F. A. B.

FRIES (Carl). *Resorbed feldspar in a basalt flow*. Amer. Min., 1939, vol. 24, pp. 782-790, 1 fig.

A detailed description of the plagioclase content of one of the Triassic flows of basalt forming the headland of Cape d'Or, Nova Scotia. The magma picked up andesine from an unknown source and on cooling the feldspar cores An_{30-40} with rugged edges and honeycombed structures were filled in and surrounded by zoned bytownite An_{70-80} . The external layers of the phenocrysts near the centre of the basalt flow contain only An_{35} .

F. A. B.

JAYARAMAN (N.). *A chemical and mineralogical study of the feldspars from the mica-pegmatites of Nellore, Madras*. Proc. Indian Acad. Sci., Sect. A, 1940, vol. 11, pp. 117-137, 2 pls., 4 text-figs.

Fifteen chemical analyses with optical and sp. gr. data are given of feldspars from the several mica mines: white albite-oligoclase (anal. I); white orthoclase (Or 96.72, Ab 2.99, An 0.29, extinction-angle on (001) '4° 30'); flesh-red microcline (Or 93.90, Ab 5.58, An 0.52); and several perthite-micropertthites and micropertthites. Green perthite II gave IIa for the green portion of potash-feldspar and IIb for the lamellae of white albite. Pale green perthite III gave IIIa for the green portion of potash-feldspar. There is a limited mutual solubility, Na-feldspar being more soluble in K-feldspar than vice versa, while K-feldspar and anorthite seem to be immiscible. The perthites show no appreciable alteration on heating, but the green colour (due to inclusions of a ferrous compound) is lost. The perthites appear to have been formed during the later stages of consolidation of the pegmatite magma.

	SiO ₂ .	Al ₂ O ₃ .	Fe as Fe ₂ O ₃ .	MgO.	CaO.	Na ₂ O.	K ₂ O.	ign.	Total.	Sp. gr.
I.	67.19	20.20	0.08	nil	0.61	9.85	2.10	0.16	100.19	2.6158
II.	65.15	19.19	0.22	0.01	0.14	2.50	13.02	0.20	100.43	2.5765
IIa.	64.71	18.42	0.28	0.02	0.05	1.12	15.05	0.22	99.87	2.5668
IIb.	66.99	20.28	0.12	nil	0.60	9.55	2.45	0.14	100.13	—
III.	65.47	19.31	0.15	0.02	0.17	3.51	11.52	0.20	100.35	2.5809
IIIa.	64.85	19.00	0.22	0.02	0.07	1.84	13.99	0.21	100.20	2.5704

	Ab.	An.	Or.	α .	β .	γ .	2V (calc.)	Extinction- angle on	
								(001).	(010).
I.	84.44	3.16	12.40	1.5256	1.5297	1.5358	78.9°	2½°	16°
IIa.	9.68	0.28	90.04	1.5198	1.5242	1.5250	49	0-1½	5° 20'
IIIa.	15.80	0.39	83.81	1.5200	1.5243	1.5256	60	0-2	6

L. J. S.

POLKANOV (A. A.) ПОЛКАНОВ (А. А.). *Gigantic labrador crystals from the plutonic gabbro-labradorites of Volhynia*. Compt. Rend. (Doklady) Acad. Sci. URSS, 1940, vol. 26, pp. 456-459, 3 figs.

Phenocrysts of labradorite measuring 12-15 cm. are frequent in the coarse-grained gabbro. One crystal in rock with grain-size 5-10 cm. at Kamenny Brod measures 80×15 cm.

L. J. S.

STRINGHAM (Bronson). *Occurrence of feldspar replacing fossils*. Amer. Min., 1940, vol. 25, pp. 139-144, 4 figs.

A dense black limestone of Carboniferous age from Provo Canyon, Utah, showing no signs of metamorphic action, contains minute (up to 0.23 mm.) well-developed crystals of plagioclase feldspar (α 1.5320, β 1.5365, γ 1.5414, indicating Ab_9An_1) and of quartz, which are also present replacing fossils. They are evidently authigenic and probably formed at a relatively low temperature. [M.A. 1-276, 2-435, 4-390.]

L. J. S.

SHAND (S. J.). *On the staining of feldspathoids, and on zonal structure in nepheline*. Amer. Min., 1939, vol. 24, pp. 508-513, 2 figs.

Syrupy phosphoric acid is applied to a thin rock section with a glass rod and after three minutes the slide is dipped in water and then immersed in methylene blue solution for a minute. Nepheline, sodalite, and analcime are stained deep blue, melilite a paler blue, and leucite is not affected. For preservation of the silica gel without cracking, the stained section is washed and at once covered with a drop of thick glue solution and a cover slip. Potash-rich nepheline from Lake Kivu [M.A. 7-29] and calcium-rich artificial nepheline both stain uniformly and completely, whereas so-called albite-rich nepheline from Kenya develops a complicated system of stained and unstained zones. The zoning of the last specimen is due to rhythmic deposition of layers of nepheline alternately richer and poorer in silica.

F. A. B.

KEITH (M. L.). *Selective staining to facilitate Rosiwal analysis*. Amer. Min., 1939, vol. 24, pp. 561-565, 1 fig.

A technique is described in detail of combining two previously described

methods for staining nepheline and potash-felspar. This eliminates the need for identifying individual grains of many minerals and so speeds up a Rosiwal analysis.

F. A. B.

VOLAROVICH (M. P.) Волярович (М. П.). *Calculation of the activation energy and heat of fusion of feldspars and pyroxenes from viscosity measurements.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1939, vol. 24, pp. 938-941, 3 figs.

Using the data obtained by Kani and Hosokawa [M.A. 7-449] in conjunction with the theoretical equation for viscosity, the author makes an attempt to calculate certain physical constants of feldspars and pyroxenes.

S. I. T.

HESS (H. H.) & PHILLIPS (A. H.) [1866-1937]. *Optical properties and chemical composition of magnesian orthopyroxenes.* Amer. Min., 1940, vol. 25, pp. 271-285, 1 pl., 3 text-figs. Correction, p. 560.

Twelve chemical analyses (some of them new) are tabulated for minerals at the magnesian end of the series (up to 15.15 % FeO), and optical data were determined on the materials analysed. Three of these analyses (0.38-13.96 % FeO) are selected for fixing the curves of the 2V and $\gamma-\alpha$ plots, it being considered that optical data give more reliable determinations of the MgO:FeO ratio than chemical analyses. Further notes are given on the presence of diopside lamellae [M.A. 7-180]. The iron-rich end of the series presents some difficulties; in the meantime the following nomenclature is proposed: enstatite (100-88½ % En), bronzite (88½-80), hypersthene (80-50), ferrohypersthene (50-12), orthoferrosilite (12-0); the first and last being optically positive and the three intermediate members optically negative. [Min. Mag. 24-165, 221.]

L. J. S.

POLKANOV (A. A.). *On the gigantic aegirite-augite crystals from the plutonic rocks of Gremyakha-Vyrmes (Kola peninsula).* Compt. Rend. (Doklady) Acad. Sci. URSS, 1939, vol. 24, pp. 935-937, 1 fig.

Large crystals, showing sub-parallel growths and up to 110 × 35 × 20 cm. in size, of aegirine-augite are met with in nepheline-syenite adjoining aegirinite and in coarse-grained ijolite-urtite pegmatite. They enclose grains of albite (4.75 % calculated from the following analysis), nepheline, &c. SiO₂ 50.03, TiO₂ 0.72, Al₂O₃ 3.27, Fe₂O₃ 18.47, FeO 9.07, MnO 0.84, MgO 0.80, CaO 8.40, Na₂O 7.62, K₂O 0.10, H₂O+ 0.85, H₂O- 0.16 = 100.33.

L. J. S.

TÔRRE DE ASSUNÇÃO (Carlos F.). *A piroxena do filão da Falagueira (Amadora)*. Bul. Mus. Lab. Min. Geol. Univ. Lisboa, 1937, vol. 2 (for 1935-37), pp. 141-160, 14 figs.

Optical data are given for zoned crystals of pyroxene in a basaltic rock.

L. J. S.

BELYANKIN (D. S.) & DONSKAYA (E. V.) Белянкин (Д. С.) и Донская (Е. В.). Термооптическое исследование минерала актинолита.— BELIANKIN (D. S.) and DONSKAYA (E. V.). *Thermo-optical investigation of actinolite*. Изв. Акад. Наук СССР, Сер. Геол. (Bull. Acad. Sci. URSS, Sér. Géol.), 1939, no. 1, pp. 95-104, 5 figs. (Russian with English summary.)

Actinolite from the Kashinskaya estate, Urals, gave on analysis: SiO_2 52.87, TiO_2 0.18, Al_2O_3 3.70, Cr_2O_3 0.27, Fe_2O_3 0.84, FeO 6.56, MnO 0.12, MgO 20.14, CaO 11.06, $(\text{Na}, \text{K})_2\text{O}$ 0.83, F 0.04, Cl 0.01, $\text{H}_2\text{O} +$ 3.73, $\text{H}_2\text{O} -$ 0.13 = 100.48. Heating and dehydration curves are given for this material and the following optical data after heating to various temperatures. At 400-500° with commencing oxidation of FeO the material becomes brown; at 600° when most of the FeO has been oxidized it is dark brown and pleochroic with increased refringence and birefringence and decreased extinction-angle. At 850° there is a sharp break in the curves corresponding to loss of the main part of the constitutional water and breakdown of the crystal. [M.A. 7-295.]

Temp.	Loss of H_2O .	α .	γ .	$\gamma - \alpha$.	$\gamma : \alpha$.
20°	—	1.618	1.638	0.020	17-18°
400	1.68 %	1.618	1.640	0.022	—
600	2.12	1.634	1.661	0.027	15-16
700	2.28	1.637	1.666	0.029	—
800	2.42	1.641	1.671	0.030	13-14
950	3.64	—	—	—	—

L. J. S.

LUTTON (C. Osborne). *Metamorphism in the Lake Wakatipu region, western Otago, New Zealand*. Geol. Mem. Dept. Sci. Indust. Res. New Zealand, 1940, no. 5, 84 pp., 3 maps, 17 pls., 17 text-figs. Price 6s.

Description with chemical analyses of schists of the chlorite zone (four subzones distinguished) of metamorphism of Palaeozoic greywackes. The following analyses are given of minerals separated by centrifuging in addition to those previously published, Min. Mag. 25-172, 207). I, actinolite from albite-stilpnomelane-actinolite-schist. II, actinolite from actinolite-schist. III (also SrO 1.23), piemontite from quartz-muscovite-piemontite-schist; pleochroism, α canary-yellow, β pale

amethyst, γ deep wine-red; absorption, $\gamma > \alpha > \beta$; positive. These data are compared with those for piedmontite from other localities [Min. Mag. 25-119], and a Mn_2O_3 - Al_2O_3 - Fe_2O_3 plot is given of epidote minerals. IV, garnet (50 % spessartine) from garnet-actinolite-magnetite-schist.

	SiO_2	TiO_2	Al_2O_3	Cr_2O_3	Fe_2O_3	FeO	NiO	MnO	MgO	CaO	Na_2O
I.	51.40	0.74	3.88	—	3.90	14.91	—	0.33	11.22	10.17	1.67
II.	50.21	1.20	4.55	0.10	2.77	9.03	n.d.	0.19	17.85	9.69	0.40
III.	36.82	0.61	20.65	—	9.68	—	(Mn ₂ O ₃ 9.99)		0.04	18.96	trace
IV.	36.55	0.62	18.49	—	5.30	5.00	—	23.26	0.53	9.87	nil

	K_2O	$\text{H}_2\text{O}+$	$\text{H}_2\text{O}-$	F.	Total	Sp. gr.	α	β	γ	2V.	$\gamma:c$
I.	0.09	1.90	0.04	—	100.25	—	1.650	1.663	1.670	65°	16°
II.	0.23	4.05	0.02	0.15	100.44	—	1.634	—	1.646	72	—
III.	trace	2.06	0.06	—	100.10	—	1.754	1.772	1.795	85	—
IV.	nil	0.58	0.02	—	100.22	—	—	—	—	—	—

L. J. S.

KORITNIG (Sigmund). *Ein Beitrag zur Kenntnis über den "Karinthin"*.

Zentralbl. Min., Abt. A, 1940, pp. 31-36.

A dark brown hornblende ('carinthine') in eclogite from Gertrusk, Sau Alpe, Carinthia, has sp.gr. 3.13, α 1.636, β 1.647, γ 1.659, and gave on analysis SiO_2 44.60, TiO_2 1.30, Al_2O_3 14.14, Fe_2O_3 1.76, FeO 4.98, MgO 15.40, CaO 11.46, Na_2O 3.20, K_2O 1.17, H_2O 2.01, total 100.02. The eclogites from this district also contain blue-green and violet hornblendes.

L. J. S.

[KOLENKO (B. Z.)] Коленко (Б. З.). Кроссит в зеленокаменных сланцах северного Урала — KOLENKO (B. Z.). *Crossite in the greenstone schists of the north Urals*. Изв. Акад. Наук СССР, Сер. Геол. (Bull. Acad. Sci. URSS, Sér. Géol.), 1939, no. 5, pp. 144-157, 2 pls. (Russian with English summary.)

Crossite is found in green-schists of northern Urals. It occurs in the form of prismatic or acicular crystals of bluish tint, $\gamma-\alpha$ 0.004-0.005, negative, optical plane perpendicular to (010), $2E > 128^\circ$, pleochroism very strong, α light brownish to almost colourless, β blue, γ violet. It is suggested that crossite-schists were derived from alkalic basic igneous rocks.

S. I. T.

[EGOROVA (E. N.)] Егорова [Ек. Н.). О никеленосности оливина.

EGOROVA (K. N.). *On the nickel-bearing olivine*. Зап. Всеросс. Мин. Общ. (Mém. Soc. Russe Min.), 1938, ser. 2, vol. 67, pp. 262-272, 1 fig. (Russian with English summary.)

Analyses of eleven olivines from various localities and one olivine from

a meteorite are given. With the exception of one specimen (MgO 42.74, NiO 0.58, S 0.55) the analysed specimens gave MgO 46.72-55.74, NiO 0.00-0.41, S trace-0.14. The refractive indices (α and γ) of all the specimens are also given. Although no NiO was found in the specimens of pure forsterite, it is suggested that in general the amount of NiO decreases with the decrease of MgO. It is suggested that the major portion of nickel in the olivines analysed is present in the form of nickel orthosilicate, but small amounts of nickel sulphide, nickel oxide, and metallic nickel may also be present. [M.A. 7-142.] S. I. T.

LEOPOLD (G.). *Über das Auftreten von Monticellit in den ankaratitischen Gesteinen der Schwälbischen Alb.* Zentralbl. Min., 1940, pp. 36-40, 6 figs.

A border of granular monticellite occurs around corroded crystals of olivine in ankaratite (a basic calcium-rich rock) from Krafraun.

BAKER (George). *Orthite in some Victorian granitic rocks.* Proc. Roy. Soc. Victoria, 1937, vol. 50, pp. 47-58, 23 figs.

Microscopic crystals of orthite were found in granite and granodiorite from several localities in Victoria. They are more abundant in xenoliths and basic streaks. L. J. S.

HUTTON (C. O.). *Optical properties and chemical composition of two micas from Westland, South Island, New Zealand.* New Zealand Journ. Sci. Techn., Sec. B, 1940, vol. 21, pp. 330B-331B.

I, Muscovite plates in tourmaliniferous pegmatite from Duffer Creek, Mikonui subdivision. II, Fuchsite as bright green scales in corundum-chist (goodletite) from Whitcombe Valley, Mikonui.

	SiO ₂ .	TiO ₂ .	Al ₂ O ₃ .	Cr ₂ O ₃ .	Fe ₂ O ₃ .	FeO.	MnO.	MgO.	CaO.	Na ₂ O.	K ₂ O.	Li ₂ O
I.	45.12	0.51	34.19	n.d.	0.85	0.64	0.02	0.92	0.25	0.71	10.33	trace
II.	44.87	0.02	37.72	0.27	0.54	nil	trace	0.32	0.36	1.04	9.83	trace
	V ₂ O ₅ .	P ₂ O ₅ .	F.	H ₂ O+.	H ₂ O-.	Total.	Sp. gr.	α .	β .	γ .	2V.	
I.	0.01	0.10	0.05	5.05	1.57	100.32	2.819	1.5590	1.5932	1.5976	43°	
II.	0.09	0.08	nil	4.72	0.38	100.24	2.821	1.5590	1.5930	1.5973	46	

Analyses by F. T. Seelye. Recalculated on the basis of 12(O,OH,F) the Al is divided almost equally between the X and Y groups (cations of the co-ordination numbers 6 and 4).

I. (OH)_{2.26}(Mg,Fe'',Fe''',Ti,Al)_{1.93}[(Si,Al)₄O₁₀](K,Na,Ca)_{0.99}

II. (OH)₂(Mg,Fe''',Cr,Al)_{1.98}[(Si,Al)₄O₁₀](K,Na,Ca)_{0.98}.

L. J. S.

BERGGREN (Thelma). *Minerals of the Varuträsk pegmatite. XV. Analyses of mica minerals and their interpretation.* Geol. För. Förh. Stockholm, 1940, vol. 62, pp. 182-193, 2 figs. [M.A. 7-335.]

Detailed analyses are given of five lepidolites and four muscovites and the results calculated to the four end-members of R. E. Stevens [M.A. 7-353]. A coarsely crystalline purple lepidolite from pegmatite contains more (63.66 %) of the hypothetical lithium-muscovite molecule than found by Stevens. For this the formula $K_4Li_6Al_{10}Si_{12}O_{41}F_5OH$ is suggested instead of $K_4Li_6Al_{10}Si_{12}O_{40}(F,OH)_8$. Spectrographic analysis shows the presence of small amounts of rubidium and caesium, the highest values in an almost colourless lepidolite with Rb_2O 2.70, Cs_2O 1.90, Li_2O 4.35 %.

L. J. S.

FRANKEL (J. J.). *The green colour of the Hospital Hill quartzites.* Trans. Geol. Soc. South Africa, 1940, vol. 42 (for 1939), pp. 15-17.

Green pleochroic sericite containing 1.25 % Cr_2O_3 occurs with chromite and zircon in quartzite at the Witwatersrand University, Johannesburg. Detrital chromite is regarded as the source of the chromium. E. D. M.

HOWARD (Arthur David). *Cristobalite in southwestern Yellowstone Park.* Amer. Min., 1939, vol. 24, pp. 485-491, 4 figs.

X-ray and optical data reveal the presence in rhyolite lava, near the junction of the Firehole and Gibbon rivers, of cristobalite pellets up to 1 mm. in diameter sometimes covered by tiny, tabular prisms of tridymite. The cristobalite was probably formed partly by the reaction between invading solutions and the glass of the lithophysae; if so, conditions over wide areas in Yellowstone Park favour its formation at the present time.

F. A. B.

TYLER (Stanley A.). *Zircon studies in the New Jersey highlands.* Amer. Journ. Sci., 1940, vol. 238, pp. 260-271, 1 fig.

Heavy concentrates from the pre-Cambrian gneisses and included bands of limestone and iron-ore contain rounded grains of the hyacinth variety of zircon, whereas from the younger granite the zircon is of the malacon variety. Zircons in the Palaeozoic sediments have been derived from the gneisses.

L. J. S.

GALLITELLI (P.). *Analisi chimica del granito di Montorfano e del granito e della tormalina di Alzo.* Atti (Rend.) R. Accad. Lincei, Cl. Sci. fis. mat. nat. Roma, 1937, ser. 6, vol. 26, pp. 103-106.

Chemical analyses are given of four granites and a tourmaline, and an optical description of the tourmaline.

M. H. H.

MAYNARD (J. E.). *Some modes of quartz-bearing plutonites from Derby, Vermont*. Amer. Min., 1939, vol. 24, pp. 653-656.

The modes of various granitic rocks have been determined by the Rosiwal method preliminary to a detailed petrographic study.

F. A. B.

KUPLETSKY (B. M.) & KOVALEVA (O. I.). *Essay of a rational quantitative mineralogical classification of granitoids*. Compt. Rend. (Doklady) Acad. Sci. URSS, 1939, vol. 23, pp. 557-560, 3 figs.

This is an attempt to classify granitic rocks according to their modal composition.

S. I. T.

[ПРЕОБРАЗHENSKY (I. A.)] Преображенский (И. А.). Оловоносные гранитоиды Борщовочного хребта (восточное Забайкалье). ПРЕОБРАЗHENSKY (J. A.). *The tin-bearing granitoids of the Borshchovochny range in east Transbaikalia*. Труд. Петр. Инст. Акад. Наук СССР (Trav. Inst. Pétrogr. Acad. Sci. URSS), 1939, no. 14, pp. 67-125, 22 figs. (Russian with English summary.)

A petrographical description accompanied by chemical analyses is given of granites, tin-bearing pegmatites, aplites, and greisen of the Borshchovochny range in eastern Siberia.

S. I. T.

BAKER (George). *Cordierite granite from Terip Terip, Victoria*. Amer. Min., 1940, vol. 25, pp. 543-548, 2 figs.

Cordierite is of rare occurrence in the granites of Victoria, but it has been found at several points in the Strathbogie mass near the junction with Silurian shale (altered to spotted cordierite-hornfels). It is abundant as bluish-grey patches up to 10 mm. long, forming 6.8 volume % of the rock. It is mostly altered to muscovite, chlorite, and pinite, but occasionally shows residuals of clear, optically negative material. It is probably the result of pyrogenetic recrystallization of assimilated aluminous material, rather than from the breaking down of cordierite-bearing xenoliths.

L. J. S.

TERZAGHI (Ruth D.) [formerly DOGGETT (R. A.)]. *The rapakivi of Head Harbor Island, Maine*. Amer. Min., 1940, vol. 25, pp. 111-122, 4 figs.

The granite of Head Harbor Island, a facies of the normal granite of Jonesboro nearby, shows large (2 cm.) rounded phenocrysts of perthitic orthoclase (anal. I, by F. A. Gonyer) with a border of oligoclase (anal. II), and has the structural peculiarities of a typical rapakivi, though the ovoids are not so large and numerous.

	SiO ₂ .	Al ₂ O ₃ .	Fe ₂ O ₃ .	MgO.	CaO.	BaO.	Na ₂ O.	K ₂ O.	H ₂ O.	Total.
I.	65.38	18.96	0.48	0.12	0.18	0.06	3.64	10.74	0.44	100.00
II.	63.08	22.90	0.46	trace	3.80	n.d.	8.80	0.56	0.32	99.92

A plot of the normative feldspar of rapakivi analyses on the Or-Ab-An diagram [M.A. 5-67, 6-121] shows most of them in the plagioclase field near the boundary with the orthoclase field. This suggests that rapakivi is of magmatic origin rather than the result of granitization [M.A. 7-186]. Conditions of crystallization are discussed: deposition of the oligoclase mantle may be due to a change in the orthoclase-plagioclase field boundary.

L. J. S.

MARSHALL (P.). *Spheroidal granites from New Zealand*. Rep. Australian & New Zealand Assoc. Adv. Sci., 1939, vol. 24, pp. 98-99. (Abstract.)

Spheroidal granites are known from three localities in New Zealand. The best example is at Karamea, at the north end of the South Island, where the spheroids (9 inches across) are built up of concentric layers alternately of black mica and white oligoclase. Smaller ($1\frac{1}{2}$ inch) spheroids show a radial arrangement of the light and dark minerals.

L. J. S.

WAHLSTROM (Ernest E.). *Graphic granite*. Amer. Min., 1939, vol. 24, pp. 681-698, 16 figs.

A petrofabric study of numerous sections of graphic granite from various localities does not confirm Fersman's law of definite crystallographic orientation between the quartz and feldspar [M.A. 2-63, 4-43]. The most abundant feldspar in graphic granite is microcline-microperthite; no specimen studied by the author contained orthoclase. Most graphic granite is considered to have been formed by partial replacement of massive microcline by quartz from silica-rich solutions which were guided by fractures or complex zones of weakness in the feldspars. Some graphic granite may, however, have been formed by simultaneous growth of the two minerals. [M.A. 6-428.]

F. A. B.

SATTERLY (J.). *An orbicular gabbro from Tremeeer lake, Kenora district, Ontario*. Univ. Toronto Studies, Geol. Ser., 1940, no. 44, pp. 75-82, 2 figs.

Orbicules (7-20 mm.) consisting mainly of radial crystals of bytownite (An₈₀) and cores of chlorite make up 53 % of a gabbro forming part of a stock intruding Keewatin volcanics. These are thought to be due to the crystallization of olivine or pyroxene at many centres, followed by

bytownite. An analysis of the orbicular gabbro, by the [Ontario] Provincial Assay Office, gave SiO_2 49.36, Al_2O_3 23.14, Fe_2O_3 1.24, FeO 5.46, MgO 5.24, CaO 10.64, Na_2O 1.94, K_2O 0.36, H_2O 1.75, CO_2 0.21, TiO_2 0.52, P_2O_5 0.06, MnO 0.09, Cr_2O_3 none, FeS_2 0.22, total 100.23; sp.gr. 2.863.

M. A. P.

SWITZER (George). *Granite pegmatites of the Mt. Antero region, Colorado.*

Amer. Min., 1939, vol. 24, pp. 791–809, 9 figs.

A study of the mineralization of beryllium-rich pegmatites and veins in the granite shows that the upper limit of formation of the pegmatites is approximately 600°C . and the lower limit for the veins is less than 200°C . A description of the less common minerals bertrandite, beryl, fluorite, and phenakite from this region is also given. Colourless, transparent, platy crystals of bertrandite tabular to (001) up to 1 cm. long and heart-shaped twins are figured and a new angle-table for the mineral is derived from the X-ray axial ratios $a:b:c = 0.571:1:0.298$ of Ito and West [M.A. 5–324]. The unit-cell dimensions of phenakite, sp.gr. 2.97–3.00, from Mt. Antero are a 12.40, c 8.24 Å.

F. A. B.

MAURICE (C. S.). *The pegmatites of the Spruce Pine district, North Carolina.* Econ. Geol., 1940, vol. 35, pp. 49–78, 158–187, 29 figs.

This district is the main source of feldspar and sheet-muscovite in North America. A field investigation was made of 180 pegmatites and over 100 feldspars were determined optically by the immersion method. The following main types are recognized: I, common, non-commercial pegmatites with oligoclase (An_{27-12}), and perthite absent or present in small or equal amounts; II, pegmatites with coarse oligoclase (An_{29-13}) with or without a quartz midriff; III, pegmatites mined chiefly for sheet-mica, with oligoclase (An_{28-10}), and perthite absent or subordinate; IV, pegmatites mined chiefly for potash-feldspar; V, miscellaneous pegmatites, aplites, and other rocks. The dominance of calcic oligoclase over potash-feldspar is emphasized and the origin of the pegmatites is discussed.

M. A. P.

SHAUB (B. M.). *On the origin of some pegmatites in the town of Newry, Maine.* Amer. Min., 1940, vol. 25, pp. 673–688, 11 figs.

The veins show a banding: fine-grained albite on the hanging wall, followed by quartz with some albite and muscovite, and succeeding bands of muscovite and albite (cleavelandite). These are believed to result from rhythmic fractional crystallization of a single intrusion of

pegmatite magma; and the author finds no evidence in support of the theory of later alterations and replacements. [M.A. 3-36, 203; 4-393.]

L. J. S.

McLAUGHLIN (Thad G.). *Pegmatite dikes of the Bridger Mountains, Wyoming*. Amer. Min., 1940, vol. 25, pp. 46-68, 10 figs.

Intrusion of granite into hornblende-schist was followed by two distinct intrusions of granite-pegmatite; the first along joint-planes parallel to the foliation of the schist, and the second along a later set of joint-planes. The older intrusion was followed by hydrothermal solutions rich in silica and potash which replaced the schist by quartz and sericite rather than the minerals of the dikes. The younger dikes were followed by hydrothermal solutions which largely altered the original minerals, producing banded arrangements of muscovite, lithium minerals, and albite (cleavelandite). Petalite is abundant in places and is often represented by pseudomorphs of albite. These pegmatites have been worked on a small scale for feldspar, mica, beryl, lepidolite, and tantalite.

L. J. S.

SÖHNGE (P. G.). *Paragenesis of the Khan pegmatite, South West Africa*. Trans. Geol. Soc. South Africa, 1940, vol. 42 (for 1939), pp. 23-34, 1 pl., 1 text-fig. (map).

The order of crystallization in the pegmatite of the Khan copper mine, 35 miles ENE. of Swakopmund, was deduced from an examination of specimens collected by C. Palache. In addition to a large number of typical pegmatite minerals, diopside, wollastonite, andradite, and graphite indicate reaction with invaded limestone, while the later hydrothermal stage is represented by sulphides including bornite, chalcopyrite, and chalcosine. Very brief descriptions are given of the various minerals.

E. D. M.

FURNIVAL (G. M.). *Notes on quartz "dikes"*. Amer. Min., 1939, vol. 24, pp. 499-507.

TOLMAN (Carl). *Discussion of "Notes on quartz dikes"*. Ibid., pp. 519-521.

The first author has collected numerous literature references which lead to the conclusion that 'No occurrence of a body of quartz which has undoubtedly formed by the action of magmatic processes, that is by direct crystallization from an igneous magma, has been described in geologic literature'. The second paper answers criticisms of an earlier paper on the same theme.

F. A. B.

STEVENSON (Louise Stevens). *Rhyodacite from the Tranquille plateau, British Columbia*. Amer. Min., 1939, vol. 24, pp. 446-447, 2 figs.

Description of a white, fine-grained rhyodacite from the Tertiary lavas of British Columbia. The rock is made up of fine groundmass of quartz (86 %) with irregular spherulites perhaps of cristobalite, oligoclase (6), sanidine (4), quartz phenocrysts (3), and brown biotite (1 %).

F. A. B.

BOGUE (Richard) & HODGE (Edwin T.). *Cascade andesites of Oregon*. Amer. Min., 1940, vol. 25, pp. 627-665, 9 figs.

The several lava flows show considerable variation in the mineral assemblage, and chemical analyses of the rocks show SiO_2 50.80-62.92 %. These differences are attributed to a progressive change from a dacitic magma towards a basic andesite end-product composed of pigeonite and labradorite, with assimilation of foreign material, resorption reactions, and arrested stages in the process of crystallization. Plagioclases range from bytownite in the core of phenocrysts to oligoclase in microliths, and olivines from 98 % forsterite to 94 % fayalite. Optical data are plotted against composition for the olivines and the pigeonite-augite series (but no chemical analyses are given of the minerals).

L. J. S.

WAGER (L. R.) & DEER (W. A.). *Geological investigations in east Greenland. Part III. The petrology of the Skaergaard intrusion, Kangerdlugssuaq, east Greenland*. Meddel. om Grønland, 1939, vol. 105, no. 4, 352 pp., 27 pls., 1 map, 2 sheets of tables, 68 text-figs. Price 20.00 kr.

The igneous complex outcrops as a circular area of 50 sq. km. and extends downwards as a funnel. It consists of a layered series of gabbros (olivine-hypersthene-gabbro below, a middle portion of gabbro free from olivine, and the upper part of ferrogabbro rich in iron and with some quartz) surrounded and partly capped by a marginal series of olivine-gabbro which is taken to represent the composition of the original magma. The fractional crystallization and differentiation of this magma are discussed in detail, and convection currents in the funnel are invoked. From below, upwards feldspars grade from An_{61} to An_{30} , olivines from 34 to 97 % fayalite, orthopyroxenes from 41 to 60 % ferrosilite, and clinopyroxenes from diopsidic to hedenbergite-clinoferrosilite. Twenty-four detailed rock analyses are given, four of olivines [M.A. 7-447], and five of clinopyroxenes [Min. Mag. 25-15]. Stilpnomelane in granophyre inclusions (xenoliths of acid gneiss) in the marginal series gave SiO_2 45.29,

TiO₂ 0.02, Al₂O₃ 5.57, Fe₂O₃ 23.95, FeO 8.99, MnO 1.14, MgO 3.30, CaO 4.28, H₂O+ 6.12, H₂O- 1.79 = 100.45; α 1.626, $\beta = \gamma$ 1.745, 2V 0°.

L. J. S.

WADE (Arthur) & PRIDER (Rex T.). *The leucite-bearing rocks of the west Kimberley area, Western Australia*. Quart. Journ. Geol. Soc. London, 1940, vol. 96, pp. 39-98, 3 pls., 10 text-figs.

A detailed account is given of the field occurrence and petrology, with several chemical analyses, of the volcanic rocks in the western part of the Kimberley division in the north of Western Australia, from which the new minerals magnophorite and wadeite have been recently described [Min. Mag. 25-373]. The rocks, named wolgidite, fitzroyite, cedricite, and mamilite, form a differentiation series, which is compared with the wyomingite-orendite of the Leucite Hills in Wyoming.

L. J. S.

[SMORCHKOV (I. E.)] Сморчков (И. Е.). Щелочные породы р. Зеравшана в Туркестане.—SMORCHKOV (I. E.). *The alkaline rocks of the upper part of the Zeravshan river in Turkestan*. Труд. Петр. Инст. Акад. Наук СССР (Trav. Inst. Pétrogr. Acad. Sci. URSS), 1939, no. 14, pp. 127-156, 11 figs. (Russian with English summary.)

A detailed petrographical description, accompanied by chemical analyses, is given of the intrusive rocks of the upper reaches of Zeravshan river. The following rocks are described: granite, quartz-syenite, alkali-syenite, nepheline-syenite, albitite, minette, spessartite, pegmatite. Cancrinite and calcite are rather abundant in nepheline-syenite and it is thought that some of the calcite may be of magmatic origin. S. I. T.

[DORFMAN (M. D.) & TIMOFEEV (V. D.)] Дорфман (М. Д.) и Тимофеев (В. Д.). К петрографии щелочного массива Ходжа-Ачкан.—DORFMAN (M. D.) & TIMOFEEV (V. D.). *To the petrography of the alkaline massif Khodzha-Achkhan at the Alaisky range*. Труд. Петр. Инст. Акад. Наук СССР (Trav. Inst. Pétrogr. Acad. Sci. URSS), 1939, no. 14, pp. 157-195, 20 figs. (Russian with English summary.)

Intrusive alkaline rocks of Khodzha-Achkhan in Turkestan are described. They include a great variety of nepheline-syenites (aegirine-, aegirine-augite-, biotite-, sodalite-, and orthoclase-). The majority of them contain cancrinite, calcite, and fluorite. The last two minerals are also found in dikes. The paragenesis of the minerals is discussed.

S. I. T.

[NEFEDOV (N. K.)] Нефедов (Н. К.). Некоторые новые породы Ловозерского плутона на Кольском полуострове.—NEFEDOV (N. K.). *Some new rocks of the Lovozero pluton on the Kola-peninsula*, Зап. Всеросс. Мин. Общ. (Mém. Soc. Russe Min.), 1938, ser. 2, vol. 67, pp. 507–525, 2 pls., 3 text-figs. (Russian with English summary.)

A petrographical description and analyses are given of several new types of loparite-bearing rocks including lujavrite, urtite, juvite, and malignite. S. I. T.

KAZAKASHVILI (G. G.) & TOPURIA (P. A.). *On some syenite rocks of the Supsa river (west Georgia)*. Compt. Rend. (Doklady) Acad. Sci. URSS, 1939, vol. 23, pp. 553–556, 2 figs.

Two syenitic intrusions from western Georgia, Caucasus, are described. The first intrusion shows a marked change in composition in a vertical direction; the upper part is a leucocratic syenite-porphry rich in anorthoclase. The second intrusion is made of analcime-syenite with satellitic veins of analcime-trachyte and analcime-gabbro-syenite. Three analyses of syenite and two of anorthoclase are given. S. I. T.

[KOTLYAR (V. N.)] Котляр (В. Н.). Интрузии нефелиновых сиенитов на Кавказе.—KOTLIAR (V. N.). *Intrusions of nepheline syenites on the Caucasus*. Зап. Всеросс. Мин. Общ. (Mém. Soc. Russe Min.), 1938, ser. 2, vol. 67, pp. 290–307, 2 figs. (Russian with English summary.)

Several intrusive masses of Tertiary age in the Pambak range, northern Armenia, are described. The central part of the complex is nepheline-syenite which towards the periphery passes into an alkali-syenite and farther into quartz-syenite and granite. Certain varieties of syenite contain fluorite, sodalite, and zircon. [Cf. M.A. 7–452.] S. I. T.

[SVYATLOVSKY (A. E.) & DITERIKHS (F. M.)] Святловский (А. Е.) и Дитерихс (Ф. М.). Материалы к изучению апатитовых месторождений Хибинских тундр.—SVIATLOVSKY (A. E.) and DITERIKHS (F. M.). *On apatitic deposits of the Khibine tundras*. Изв. Акад. Наук СССР, Сер. Геол. (Bull. Acad. Sci. URSS, Sér. Géol.), 1939, no. 4, pp. 80–93, 1 pl. (map), 9 text-figs. (Russian with English summary.)

The geological structure of the north-western part of the Khibina

tundra is described. It is suggested that the apatite and sphene-apatite rocks represent an independent intrusion of apatite magma which forced its way along the contact between the ijolite-urtite dike (ring-dike?) and the rischorrite. [M.A. 6-232, 308, 312, 366; 7-442.] S. I. T.

LOEWINSON-LESSING (F.) [1861-1939]. *Some queries on classification and nomenclature of igneous rocks. II.* Compt. Rend. (Doklady) Acad. Sci. URSS, 1938, vol. 21, pp. 129-133.

Three groups of igneous rocks are discussed: (1) andesites, which are considered to be differentiation products of a basic magma; (2) trachytes, the effusive equivalents of alkali-syenites, which in their turn are derived either from the basic or the acid magma; (3) spilites, derived from basic magma enriched in soda. S. I. T.

[LEVINSON-LESSING (F. Y.)] Левинсон-Лессинг (Ф. Ю.) [1861-1939]. Проблемы магмы. [*Problems of the magma.*] Учен. Зап. Ленинград. Госуд. Унив., Сер. Геол. (Annals Leningrad State Univ., Ser. Geol.), 1938, no. 17, pp. 191-200.

— Левинсон-Лессинг (Ф. Ю.). Проблемы магмы (Статья вторая). [*Problems of the magma (Second paper).*] Изв. Акад. Наук СССР, Сер. Геол. (Bull. Acad. Sci. URSS, Sér. Géol.), 1939, no. 1, pp. 1-25. (Russian with English summary.)

These two papers are the extension of previously published works [M.A. 6-302]. The classification of magmas and igneous rocks is further elaborated and the problem of the origin of the various types of magma is discussed. The existence of magmatic-metasomatic rocks, products of volatile transfusion and hybridization, is accepted with certain reservations, but only a minor importance is attached to this class of rocks. In the discussion of the relation between the movement of magma and diastrophism it is emphasized that magmatic processes are associated only with the vertical movements of the earth's crust and that, in general, flood eruptions are associated with elevation and sill intrusions with subsidence. S. I. T.

EMMONS (R. C.). *The contribution of differential pressures to magmatic differentiation.* Amer. Journ. Sci., 1940, vol. 238, pp. 1-21, 2 pls., 2 text-figs.

Transportation of the liquid portion of a magma after partial crystallization may be effected by differences in pressure in fractured rocks. Various examples of such action are considered. L. J. S.

WASHINGTON (H. S.) [1867-1934]. *The crust of the earth and its relation to the interior*. Chapter 5 (pp. 91-123) in *Physics of the earth*, vol. 7, New York and London, 1939. (Revised by L. H. Adams.)

A readable account, with many references to the literature, of present knowledge and speculation. Useful tables give the average chemical composition of igneous rocks, plateau basalt, and meteorites. A general account of meteorites and tektites is included. L. J. S.

SHEPHERD (E. S.). *Note on the fluorine content of rocks and ocean-bottom deposits*. Amer. Journ. Sci., 1940, vol. 238, pp. 117-128, 1 fig.

Fluorine has usually been overlooked in rock analyses, and estimates of the average amount in the earth's crust have been too low. An average value of about 0.04 % is now tentatively suggested. Determinations made by the method of Willard and Winter (1933; volatilization as fluosilicic acid and titration with thorium nitrate) on 78 rocks of various types and a number of deep-sea deposits show a range F 0.007-0.685 %. L. J. S.

JAGGAR (T. A.). *Magmatic gases*. Amer. Journ. Sci., 1940, vol. 238, pp. 313-353, 4 pls.

A discussion of 26 published chemical analyses of gases collected at Kilauea, especially with regard to the relative proportions of H_2O , CO_2 , CO , SO_3 , SO_2 , S, N, H, A, Cl. [M.A. 7-448.] L. J. S.

INGERSON (Earl). *Comparison of the fabrics of inclusions and the adjacent intrusive rock*. Amer. Min., 1939, vol. 24, pp. 607-623, 29 figs.

Fabric studies by measuring the orientations of the numerous biotite, quartz, and hornblende inclusions have been made of the three intrusions: (1) the Port Deposit granodiorite, Maryland; (2) the Uncle Sam quartz-monzonite porphyry, Arizona; and (3) the Val Verde tonalite, California. The xenoliths in an intrusion that has not been subjected to regional metamorphism retain their original fabric, whereas the fabric of inclusions in an intrusion that has been so subjected conforms in type mainly to that of the host. F. A. B.

COATS (Robert). *Propylitization and related types of alteration on the Comstock lode*. Econ. Geol., 1940, vol. 35, pp. 1-16.

The Alta andesite is a series of pyroxene- and hornblende-andesite flows and breccias with interbedded rhyolitic tuff, more than 2,000 feet thick. Freshest specimens consist of plagioclase (An_{50-64}), bastite (after hypersthene?), diopsidic augite, pigeonite (rare), and hornblende, with

accessory apatite, magnetite, and zircon, in a recrystallized glassy mesostasis. Deuteric alteration (autohydration) gives bastite; propylitic alteration results in epidote, chlorite, magnetite, albite, sericite, calcite, and quartz; zeolitic alteration yields albite and natrolite. It is suggested that these alterations are due to hydrothermal activity prior to the deposition of the ore.

M. A. P.

SCHWARTZ (George M.). *Hydrothermal alteration of igneous rocks*. Bull. Geol. Soc. America, 1939, vol. 50, pp. 181–237, 8 figs.

A review of the hydrothermal alteration of igneous rocks, especially of those connected with mineral veins. A list of references is appended.

S. I. T.

HETZEL (W. H.). *Boetoniet, een bijzonder gesteente van het eiland Boeton (Z. O.-Celebes)*. De Ingenieur in Nederlandsch-Indië, Sect. 4, 1938, vol. 5, pp. 150–155, 1 pl., 1 text-fig.

The rock boetonite occurs on the island of Boeton in more or less vertical veins up to ten metres thick traversing ultra-basic rocks, crystalline schists, and sediments. It consists mainly of opal and chalcedony with some chromite and marcasite, and sometimes magnesite. Analysis by H. W. V. Willems gave SiO_2 86.09, TiO_2 trace, Fe_2O_3 (and FeO) 2.40, MnO 0.02, Cr_2O_3 1.11, NiO 0.12, MgO 0.18, CaO 0.25, Na_2O 0.38, K_2O 0.05, ign. (H_2O and some organic matter and sulphur) 9.66, P_2O_5 trace = 100.26. The material has been formed from peridotites by hydrothermal action, rather than by the infiltration of surface waters.

L. J. S.

BEMMELEN (R. W. van). *A limestone-block in hypersthene-dacite from the Koeda-neck (Kromong-complex near Cheribon, western Java)*. De Ingenieur in Nederlandsch-Indië, Sect. 4, 1940, vol. 7, pp. 37–41, 2 pls.

A limestone block enclosed in hypersthene-dacite shows a narrow reaction border composed of periclase, brucite, scapolite, and other reaction minerals. The assimilation and concomitant differentiation of the magma are discussed.

S. I. T.

BEMMELEN (R. W. van). *On the origin of the Pacific magma types in the volcanic inner-arc of the Soenda mountain system*. De Ingenieur in Nederlandsch-Indië, Sect. 4, 1938, vol. 5, pp. 1–14, 2 pls., 7 figs.

— *The volcano-tectonic origin of Lake Toba (north-Sumatra)*. Ibid., 1939, vol. 6, pp. 126–140, 4 figs.

— *On the origin of some granites from Singapore*. Ibid., 1940, vol. 7, pp. 23–35, 2 pls., 1 text-fig.

This series of papers presents arguments, supported by examples from the Dutch East Indies, in favour of the palingenetic and synteetic hypotheses of the origin of magmas. The questions of metasomatism by alkali emanations, anatexis, diffusion, and other processes are widely discussed.

S. I. T.

KUSCHKE (G. S. J.). *The critical zone of the Bushveld igneous complex, Lydenburg district*. Trans. Geol. Soc. South Africa, 1940, vol. 42 (for 1939), pp. 57–81, 12 figs.

Rocks consisting of gabbro, pyroxenite, anorthosite, and chromitite were collected from eight profiles across the strike of the pseudo-stratification, representing thicknesses from 20 feet to over 3,000 feet. In the case of orthopyroxenes the α -vibration direction is generally normal to the pseudo-stratification, while associated clinopyroxenes have their β -vibration direction similarly oriented. Plagioclase is consistently about An_{80-81} , and in the chromitite orthopyroxene is altered to bowlingite. The composition of the orthopyroxene is most variable and generally richer in MgO when associated with chromitite. It tends to become richer in FeO upwards in the succession, but irregularities seem to indicate two separate phases of differentiation. The second phase, occurring after emplacement, is itself two-fold, being due to crystallization followed by crystal-sinking of Mg-rich pyroxenes. Chromite is mostly early but may in part be late in crystallizing. When early, it impoverishes subsequent orthopyroxene crystals in FeO. The composition of hypersthene in the Merensky reef varies, probably due to the influence of sulphides on the FeO content of the magma. E. D. M.

BILJON (S. van). *The Kuboos batholith, Namaqualand, South Africa*. Trans. Geol. Soc. South Africa, 1940, vol. 42 (for 1939), pp. 123–219, 5 pls., 43 text-figs., 1 map.

The Kuboos batholith, situated in the Richtersveld in the big bend of the Orange River some 30 miles from its mouth, covers an area of about 200 sq. miles and rises to 3,800 feet. The invaded sediments had previously suffered regional metamorphism, which obscures the effects of contact metamorphism. The granite is porphyritic, the size of perthite phenocrysts and groundmass-crystals diminishing with altitude, and

consists of perthite, plagioclase, biotite, and quartz, together with hornblende, sphene, apatite, epidote, and pyrite. Chemical analyses are given of perthite and biotite. Partial analyses of perthite and optical determination of plagioclase from various altitudes show with increasing height a fall in potash and a rise in soda content of the perthite and a concomitant fall in anorthite content of the plagioclase. This variation cannot be due to gravitational sinking of phenocrysts. Eleven rock analyses of the granite further show continuous variation with altitude, being most acid at greatest elevation. The granite shows greatest similarity to the Nama granites of the Cape Province, which are intermediate between them and the Old Granites. The Bushveld granite also shows some kinship. Structural features of the granite are mapped and descriptions, supported by analyses, are given of associated xenoliths, quartz-veins, aplite, kersantite, camptonite, bostonite, porphyry, and syenite. The structures of the invaded formations are discussed in relation to the intrusion and an estimate is made of the original size of the intrusion.

E. D. M.

LACROIX (Alfred). *Les roches dépourvues de feldspath du cortège des sakénites (Madagascar); composition chimique de cet ensemble.* Compt. Rend. Acad. Sci. Paris, 1940, vol. 210, pp. 193-196.

The sakenites [M.A. 7-456] are in places accompanied by rocks free from felspar and consisting of pyroxene or amphibole with one or more Al- and/or Mg-bearing minerals. These include the sapphirinites, composed almost entirely of sapphirine with sometimes a little spinel, and an alteration product; several varieties of spinellite, sometimes composed almost entirely of a bluish or more rarely dark green spinel; and spinel- or sapphirine-pyroxenites and a sapphirine-amphibolite, which last consists of a greenish-white amphibole rich in Al_2O_3 , and belonging to the edenites. Twelve complete analyses are given, showing compositions similar to those of magnesian marls rich in clay; they are characterized by high Al_2O_3 and CaO, low SiO_2 , and very little Fe, indicating a special class of plagioclases and pyroxenites.

C. A. S.

LACROIX (Alfred). *Les transformations minéralogiques secondaires observées dans les gisements de phlogopite de l'extrême-sud de Madagascar.* Compt. Rend. Acad. Sci. Paris, 1940, vol. 210, pp. 353-357.

The changes are described in these deposits [M.A. 7-469] where substances have been dissolved out from the highest layer by percolating rain water and redeposited in a hydrated or otherwise altered form. The

deep violet coloration of fluorite is attributed to the effect of the rare-earths of allanite. Phlogopite is more or less transformed into vermiculite accompanied by various forms of sepiolite, opal, and chalcedony. Quartz occurs pseudomorphous after calcite, but this last having been dissolved away more rapidly than replaced by quartz, the quartz is often not solid, a process termed *eisomorphism*. Lastly, the formation of prehnite and zeolites is discussed.

C. A. S.

LACROIX (Alfred). *Les modifications minéralogiques secondaires du gisement de phlogopite de Volonandronga (ouest du massif central de Madagascar)*. Compt. Rend. Acad. Sci. Paris, 1940, vol. 210, pp. 425-429.

Under a thickness of 5-6 metres of laterite occurs a series of mica-schists, together with sillimanite-quartzite, orthogneiss, lamboanite, albititic amphibolite, and pyroxenite. These are traversed by a dike of dissogenite and aplite. The pyroxenite, which is traversed by veins of phlogopite, consists of greenish-grey diopside with, in places, lamellae of phlogopite and scapolite (dipyre), and, as accessory minerals, small quantities of apatite, sphene, and molybdenite. Actinolite, tremolite, byssolite, and asbestos also occur. Much of the dipyre is replaced by albite, and fissures in the pyroxenite are filled with albitite of similar composition, the whole resembling olafite. Clinzoisite and epidote, closely grouped together, occur, as also black-brown crystals of tourmaline and minute limpid ones of heulandite.

C. A. S.

ERHART (Henri). *Sur l'altération des basaltes miocènes du Cantal et sur la nature des sols qui en dérivent*. Compt. Rend. Acad. Sci. Paris, 1940, vol. 210, pp. 537-539.

The fresh basalt contains olivine, augite, plagioclase (predominantly labradorite), magnetite, and apatite in a glassy groundmass. Alteration has resulted in the formation of limonite with intermediate antigorite from the olivine and pyroxene, and of kaolinite together with calcite from the plagioclase, so that the upper parts of the resulting soil consist essentially of limonite and kaolinite with the original magnetite and apatite. These changes are illustrated by analyses of the fresh and altered rocks and the resultant soil, showing a gradual change under the influence of the probably damp tropical forest of the Miocene, from moderate alkalinity to the slight acidity of the soil, accompanied by an increase in percentages of Al_2O_3 , Fe_2O_3 , TiO_2 , and H_2O , and decrease in those of CaO , SiO_2 , MgO , FeO , Na_2O , K_2O , CO_2 , and P_2O_5 .

C. A. S.

[ТЕОДОРОВИЧ (G. I.)] Теодорович (Г. И.). К вопросу о расширенной классификации обломочных пород. (Классификация обломочных пород по четырем компонентам).—ТЕОДОРОВИЧ (G. I.). *On a more comprehensive classification of clastic rocks*. Изв. Акад. Наук СССР, Сер. Геол. (Bull. Acad. Sci. URSS, Sér. Géol.), 1939, no. 4, pp. 162–179, 6 figs. (Russian with English summary.)

A tetrahedron is used for a detailed classification of sedimentary rocks according to four components: psephitic, psammitic, aleuritic (silt), and pelitic. S. I. T.

GRIFFITHS (J. C.). *The mineralogy of the glacial deposits of the region between the rivers Neath and Towy, south Wales*. Proc. Geol. Assoc. London, 1939, vol. 50, pp. 433–462, 2 pls., 12 text-figs.

Descriptions are given of 55 minerals identified in the heavy residues, with notes on their relative abundance and distribution. Different assemblages are characteristic of the materials deposited by different ice-sheets and derived from the rocks of different geological formations. L. J. S.

GRIFFITHS (J. C.) & STUART (Alan). *An occurrence of detrital diaspore in south Wales*. Geol. Mag. Hertford, 1940, vol. 77, pp. 74–76, 4 figs.

Small (0.4 mm.) colourless platy fragments from a sandy boulder clay at Ludchurch, Pembrokeshire, have α 1.702, β 1.722, γ 1.748. L. J. S.

Economic Minerals and Ore-deposits.

GRATON (L. C.). *Nature of the ore-forming fluid*. Econ. Geol., 1940, vol. 35, pp. 197–358.

A brilliant discussion leading to the conclusion that this fluid is an alkaline liquid of magmatic origin, not an acid gas. M. A. P.

BANDY (Mark C.). *A theory of mineral sequence in hypogene ore deposits*. Econ. Geol., 1940, vol. 35, pp. 359–381, 546–570, 2 figs.

The 'normal sequence' of ore deposition is, first, the oxides in decreasing order of the ratio of the percentage weights of the metals to oxygen; then the sulphides in increasing order of the ratio of the percentage weights of the metallic to the non-metallic elements; finally the elements. This theoretical sequence corresponds more or less to the sequence described in numerous ore-deposits. M. A. P.

SIMPSON (Edward S.) [1875-1939]. *Mineral provinces and metallogenetic epochs in Western Australia*. (Presidential address.) Journ. Roy. Soc. W. Australia, 1940, vol. 25 (for 1938-39), pp. 207-223, 7 pls. (numbered as pp. 225-237).

A general account of ore-deposits in space and time, with special reference to those of Western Australia most of which are of pre-Cambrian age. A series of maps shows the distribution in Western Australia of Au, Cu, Pb, Sn, Ta, Nb, Fe, As, coal, and asbestos. L. J. S.

RODOLICO (Francesco). *Studio a luce riflessa di alcuni minerali italiani*. Periodico Min. Roma, 1940, vol. 11, pp. 1-14, 4 pls., 1 text-fig.

Amongst the ores examined in polished sections are: 'comuccite' from S. Giorgio, Sardinia, which is homogeneous and probably identical with jamesonite [Min. Mag. 21 562]; and linnaeite from Cape Calamita, Elba. L. J. S.

BAAS (Charles E.). *The Vacluse gold mine, Orange County, Va.* Econ. Geol., 1940, vol. 35, pp. 79-91, 5 figs.

The mine lies 18 miles W. of Fredericksburg and 2 miles N. of Wilderness Post Office, in a shear zone in quartz-sericite-chlorite-schist. Gold (fineness 901-1000) occurs mostly in narrow (0.01-0.05 mm.) veinlets and inclusions in abundant pyrite which forms large pockets and masses in lenticular quartz bodies up to 200 x 30 feet in size. Remnants of partly digested wall-rock indicate that the ore was formed largely by replacement of the schist. M. A. P.

MOORE (E. S.). *Genetic relations of gold deposits and igneous rocks in the Canadian shield*. Econ. Geol., 1940, vol. 35, pp. 127-139.

A review. M. A. P.

BATEMAN (J. D.). *Rock alteration in the Uchi gold area*. Econ. Geol., 1940, vol. 35, pp. 382-404, 10 figs.

In this area, in the district of Kenora, NW. Ontario, the gold-bearing belt shows evidence of metamorphism by granitic intrusions, and hydrothermal alteration with noteworthy introduction of abundant K₂O and CO₂ rather than Na₂O and SiO₂. Gold was deposited from solution late in the sequence. Analyses by W. F. Green show the change from a relatively fresh greenstone in the country-rock (I) to the altered equivalent from the same flow in the ore-body (II).

	SiO ₂ .	TiO ₂ .	Al ₂ O ₃ .	Fe ₂ O ₃ .	FeO.	MgO.	CaO.	Na ₂ O.	K ₂ O.
I.	50.65	1.31	14.57	2.31	11.59	4.34	6.70	2.45	0.59
II.	36.60	1.31	13.01	2.15	7.41	4.48	8.78	2.76	3.28

	P ₂ O ₅ .	MnO.	H ₂ O.	CO ₂ .	FeS ₂ .	Total.	Sp. gr.
I.	0.11	0.32	2.67	2.40	0.28	100.29	2.82
II.	0.04	0.09	2.03	9.90	8.04	'100.08'	2.854

M. A. P.

SEVENSMA (Pierre). *Sur le minéral aurifère de La Bellière (Maine-et-Loire), France*. Compt. Rend. Soc. Phys. Nat. Hist. Genève, 1940, vol. 57, p. 89 (abstract).

SEVENSMA (P.). *Sur le gisement d'or de La Bellière (Maine-et-Loire, France)*. Arch. Sci. Phys. Nat. Genève, 1940, ser. 5, vol. 22, pp. 147–159, 5 figs.

The gold deposit of La Bellière is composed of steep-dipping quartz veins with a strike east-west and a width of 1 to 12 metres. The country-rock is a folded pre-Cambrian sericitic schist. The ore consists of white quartz enclosing about 1.5 % sulphides composed of arsenopyrite, pyrite, galena, and blende with some pyrrhotine and chalcopyrite. The gold is nearly always invisible to the naked eye and localized in small veinlets filled with galena or chalcopyrite in fractured arsenopyrite. The size of the particles of gold varies between one thousandth and several tenths of a millimetre. This deposit is mesothermal in origin. P. S.

SWIEGERS (J. U.). *Gold, carbon, pyrite and other sulphides in the Black Reef*. Trans. Geol. Soc. South Africa, 1940, vol. 42 (for 1939), pp. 35–45, 4 pls., 1 text-fig.

Examination of polished specimens [M.A. 7-434] reveals an early stage of pyritization forming nodules of pyrite with blende, chalcopyrite, and pyrrhotine. Later pyritization bordering these nodules is associated with gold, blende, galena, and chalcopyrite and was accompanied by the formation of carbon nodules containing gold, galena, blende, and pyrite which were subsequently bordered by still later pyrite. Some gold is possibly detrital. 24 photomicrographs illustrate the textures, but references to plates IV and V should be interchanged. E. D. M.

ANDERSON (Alfred L.). *Aikinite and silver enrichment at the St. Louis mine, Butte County, Idaho*. Econ. Geol., 1940, vol. 35, pp. 520–533, 4 figs.

In this short-lived (1884–6) silver mine, in the Lava Creek district, quartz, pyrite and marcasite, blende and wurtzite, tetrahedrite, chalcopyrite, and argentiferous galena were deposited in that order in altered Tertiary andesite and tuff. Later, aikinite as scattered crystals, seams, and lenses exceeding 1 foot, tetrahedrite, and chalcopyrite were formed

with dolomite and calcite. In the upper levels the silver-bearing 'bismuth ore' is aikinite (not benjaminite) largely or wholly replaced by argentite and silver from descending solutions. Embedded, tabular or acicular crystals of strongly anisotropic aikinite, with tapered ends and squarish sections, were identified by etching and microchemical tests.

M. A. P.

WAHLSTROM (Ernest E.). *Ore deposits at Camp Albion, Boulder County, Colorado*. Econ. Geol., 1940, vol. 35, pp. 477-500, 9 figs.

These unproductive lead-silver deposits consist of abundant argentiferous galena, pyrite, chalcopyrite, and blende, sparing tetradymite, magnetite, and molybdenite, and later chalcosine and covelline, with zoned diopsidic aegirine (anal. I), alkalic feldspar (glassy orthoclase, anal. II), quartz, calcite, soda-asbestos (near arfvedsonite, anal. III), and fluorite in a sheared and brecciated zone cutting a contact between pre-Cambrian gneiss and a composite Tertiary monzonite stock. The minerals were deposited from residual alkaline solutions, possibly as cool as 250° C., resulting from prolonged differentiation of the monzonitic magma.

	SiO ₂ .	TiO ₂ .	Al ₂ O ₃ .	Fe ₂ O ₃ .	FeO.	MnO.	MgO.	CaO.	BaO.	SrO.
I.	49.98	1.11	8.42	15.97	2.30	0.78	5.65	5.48	—	—
II.	64.98	trace	18.26	0.44	—	—	trace	0.36	trace	0.03
III.	56.48	0.30	1.22	8.38	2.67	—	17.40	2.70	—	—

	Na ₂ O.	K ₂ O.	H ₂ O.	Total.	α.	β.	γ.	
I.	9.17	0.61	0.29	99.76	1.726	1.754	1.763	α:c 28-35°
II.	1.42	14.23	0.03	99.75	1.518	1.524	1.526	α:c 5°
III.	8.09	1.82	0.87	99.93	1.633	1.639	1.642	γ:c 44°

I. (Na,Ca,K)(Fe''',Al,Mg,Fe'',Mn)(Si,Al,Ti)₂O₆.

III. (Na,K)_{2.5}Ca_{0.5}(Mg,Fe'')₄(Fe''',Al)(Si,Ti)₈O₂₃(OH).

M. A. P.

KENT (Leslie E.). *A copper occurrence in the Zoutpansberg (Bosch farm) with introductory notes on the associated rocks*. Trans. Geol. Soc. South Africa, 1940, vol. 42 (for 1939), pp. 47-55, 1 pl., 1 text-fig. (map).

Small patches and veins of chalcosine with covelline, cuprite, and malachite occur in quartz-veins in grit and quartzite, probably of Waterberg age, bordering a fault. These ores are probably derived from underlying amygdaloidal andesite which is impregnated with pyrite and chalcopyrite. Economic prospects are poor.

E. D. M.

KATO (Takeo). *On the origin of the Mozan iron ore deposits, north Korea.*
Japanese Journ. Geol. Geogr. 1939, vol. 16, pp. 233-238, 1 pl.,
3 text-figs.

The abundant ore is a magnetite-haematite-quartz-schist banded with gneiss, amphibolite, &c. of pre-Cambrian age. It contains a glaucophanic amphibole (α 1.636, β 1.648, γ 1.651, $\gamma:c = 33^\circ$, $2V$ 51-55°), diopside aegirine (α 1.709, β 1.724, γ 1.741, $\alpha:c = 18^\circ$, $2V$ 86°), or actinolite. The ore, usually low-grade with 30-40 % Fe but sometimes enriched, is a recrystallized product of ferruginous beds that have been subjected to dynamic and thermal metamorphism with addition of material from granitic magma.

L. J. S.

GAGE (M.). *The geology of the iron-ores of the Collingwood district, north-west Nelson.* New Zealand Journ. Sci. Techn., Sect. B, 1940, vol. 21, pp. 304B-313B, 1 fig. (map).

The limonitic ores were derived from pyritic materials in Tertiary conglomerate and veins in Palaeozoic sediments, and have been re-deposited in irregular superficial bodies along a line of a fault-angle depression.

L. J. S.

LEGRAYE (M.). *Fers titanés de Mozambique.* Ann. (Bull.) Soc. Géol. Belgique, 1940, vol. 63, pp. B 167-B 174, 3 figs.

Large lenticular bodies of titaniferous iron-ore occur in association with gabbro and anorthosite in gneisses and schists near Tete in the Zambezi valley. They are compared with similar occurrences in Transvaal and Natal. At Mawili the ore consists of an aggregate of large crystals of titanomagnetite, strongly martitized and penetrated by fine lamellar intergrowths of magnetite and ilmenite. Five detailed analyses of the ore show Fe 50.85-52.10, TiO_2 9.72-13.29 %, &c. At Kakanga the ore consists of a fine granular aggregate of magnetite and ilmenite. In this case it is possible to make a magnetic separation, leaving a non-magnetic portion containing TiO_2 43.13 % (in the magnetic portion TiO_2 8.25 %).

L. J. S.

HOWLAND (Arthur L.). *Specularite-alunite mineralization at Hickey's Pond, Newfoundland.* Amer. Min., 1940, vol. 25, pp. 34-45, 2 figs.

A detailed discussion of the unusual association of haematite and alunite in a banded silicified schist.

F. A. B.

[GINZBURG (I. I.) & PONOMAREV (A. I.)] Гинзбург (И. И.) и Пономарев (А. И.). Адсорбция никеля и других металлов водными силикатами железа.—GINZBURG (I. I.) and PONOMAREV (A. I.). *Adsorption of*

nickel and other metals by hydro-silicates of iron. Изв. Акад. Наук СССР, Сер. Геол. (Bull. Acad. Sci. URSS, Sér. Géol.), 1939, no. 1, pp. 85–93 (Russian), p. 94 (English summary), 3 figs.

Nickeliferous nontronite ores from the southern Urals adsorb divalent elements from solutions in the following order of preference: Ni, Co, Mn, Fe, Cu, Ba, Ca, Mg, replacing equivalent amounts of Ca and Mg. Nickel is again thrown out on the addition of NaCl; but NaCl does not extract nickel from the natural ore. The same adsorption of nickel is shown by chlorite, serpentinite, and amphibolite; and these rocks may be enriched in nickel by the action of ground-waters.

L. J. S.

FENOGLIO (Massimo) & FORNASERI (Mario). *Il giacimento di nichelio e cobalto del Crivino in Val di Susa.* Periodico Min. Roma, 1940, vol. 11, pp. 23–43, 4 pls.

Ores from the abandoned mine in chlorite-epidote- and serpentine-schists were examined in polished sections. Smaltite-chloanthite shows a zonal structure and gave As 76.70, Sb 0.30, S 0.80, Co 2.77, Ni 11.15, Fe 7.55, Cu 0.20, Zn 0.91 + 100.38. Other minerals are safflorite-rammelsbergite, arsenopyrite, tetrahedrite, &c.

L. J. S.

CAILLÈRE (M^{lle} S.). *Quelques observations sur la composition minéralogique et la structure des minerais de manganèse de Bou-Arfa (Maroc).* Bull. Soc. Sci. Nancy, 1938, vol. 2, pp. 155–160.

A study of manganese ores from Hamaraouet, near Jebel Bou-Arfa, about 300 km. south of Oudjda, eastern Morocco. The following minerals have been tested chemically and their reflectivities determined: polianite, romanechite, psilomelane, hausmannite, and manganite. The ores occur with haematite, limonite, and goethite, and a description of the association is given. [M.A. 5–206.]

J. M. S.

AHLFELD (Friedrich). *Die Silber-Blei-Zinckerzlagertätte Pulacayo. (Beiträge zur Geologie und Mineralogie Boliviens Nr. 13.)* Neues Jahrb. Min., Abt. A, 1939, Beil.-Bd. 75, pp. 1–22, 5 pls., 2 text-figs.

Veins in propylitized dacite and the adjoining red clay-sandstone carry pyrite, marcasite, galena, blende, wurtzite, tetrahedrite (containing 1–14 % Ag), jamesonite, geocronite, stibnite, metastibnite, &c.

L. J. S.

SGROSSO (Pascual). *Los yacimientos estanníferos y de plata y estaño de la provincia de Jujuy, República Argentina.* Rev. Minera Geol. Min. (Soc. Argentina Minería y Geol.), 1939, vol. 10, pp. 43–64, 65–69, 6 figs.

Tin and silver ores of the Bolivian type occur in dep. Rinconada, prov.

Jujuy [near the border of Bolivia] in veins in Palaeozoic schists intruded by Tertiary dacite. Alluvial material has long been worked in this district. L. J. S.

DREYER (Robert M.). *The geochemistry of quicksilver mineralization*. Econ. Geol., 1940, vol. 35, pp. 17-48, 140-157, 7 figs.

FAHEY (Joseph J.), FLEISCHER (Michael), & ROSS (Clyde P.). *The geochemistry of quicksilver mineralization*. Ibid., pp. 465-470.

Eighteen quicksilver mines in California, Oregon, and Nevada were visited by the author of the first work. Cinnabar is deposited only from alkaline sulphide solutions, mostly at 100-150° C. and nearly at atmospheric pressure. Such solutions also dissolve silica. Cinnabar is precipitated by relief of pressure, evaporation of the solvent, and reaction with the wall-rock. Dilution gives metacinnabar and colloidal mercury; acidification gives metacinnabar. The second paper is a critical discussion of the first. M. A. P.

STEVENSON (John S.). *An epithermal scheelite deposit in the Bridge River district, B.C.* Univ. Toronto Studies, Geol. Ser., 1940, no. 44, pp. 95-105, 6 figs.

White, crystallized or granular scheelite (anal., WO_3 79.7, CaO 19.3, MoO_3 trace), chalcedonic quartz, comb quartz, stibnite blades, and ankeritic dolomite (ω 1.689), were formed in that order at low temperature and pressure in veins 1-3 inches wide cutting an area of carbonatized serpentine of Jurassic (?) age in the Tyaughton Creek valley, 14 miles N. of Minto City. M. A. P.

MANSFIELD (George R.). *Phosphate deposits of the United States*. Econ. Geol., 1940, vol. 35, pp. 405-429, 5 figs.

Recent re-estimation of the reserves of guano, apatite, phosphatic marls and limestones, and phosphate rock, show that they are greater than previously supposed, namely, at least 10,000,000,000 tons, sufficient to last more than 3,000 years at the present rate of consumption. M. A. P.

CAYEUX (Lucien). *Dolomies et silex de la formation phosphatée suesonienne du Hodna (Constantine)*. Compt. Rend. Acad. Sci. Paris, 1939, vol. 208, pp. 1541-1543.

These phosphates, which are black, hard, coherent, and impregnated with hydrocarbons, alternate with dolomite containing much calcite. All, but especially the dolomite, contain much flint, which forms some-

times half the whole. The flints appear to have been formed in limestone: they often enclose crystals of calcite. The whole process of formation appears to have been submarine.

C. A. S.

Witherite (natural barium carbonate) and its industrial uses. Issued jointly by the Holmside & South Moor Collieries, Ltd., and the owners of Settlingstones Mines, Ltd., Newcastle upon Tyne, 1940, 56 pp., 10 figs.

Practically the whole of the world's production of witherite comes from the north of England. At the Settlingstones mine in Northumberland [Min. Mag. **21**-383] a vertical vein 4-12 feet wide is in Carboniferous Limestone, and at South Moor the vein is in the Coal Measures. Particulars are given of the method of working and preparation of the material, and of the many uses to which it is put, together with a summary of barium compounds.

L. J. S.

MENDENHALL (W. C.). *Occurrence of a deposit of trona.* Science, New York, 1940, vol. 91, pp. 11-12.

Cores from a depth of 1,590 to 1,612 feet in Sweetwater Co., Wyoming, consist largely of trona (Na_2CO_3 64.45-69.27 %), with up to 15 % of shortite [M.A. 7-370] and small quantities of northupite and pirssonite. Crystals are also present in the underlying oil shale.

L. J. S.

WILLIAMS (G. J.) & SKERL (A. F.). *Mica in Tanganyika Territory.* Bull. Geol. Div., Dept. Lands & Mines, Tanganyika Territory, 1940, no. 14, 47 pp., 2 maps, 6 pls. Price 3s.

Muscovite ('ruby' and 'green') has been mined, mostly in the Uluguru Mts., since 1902, with an average annual output of 39-61 long tons of sheet mica. The mica-pegmatite veins traverse gneisses and are far distant from an outcrop of granite. Accessory minerals include uraninite, rutherfordine, plumboniobite, euclase [Min. Mag. **23**-617], &c., but in sparing amounts. Deposits of lepidolite, phlogopite, and fuchsite are known, but have not been worked. Vermiculite occurs in abundance where pegmatites traverse ultra-basic rocks near Kwekivu; analyses by W. H. Bennett gave SiO_2 38.56 (37.45), TiO_2 1.44 (1.35), Al_2O_3 14.20 (14.92), Fe_2O_3 13.20 (13.69), FeO 1.75 (1.26), MnO — (0.06), MgO 14.85 (14.09), CaO 0.19 (0.69), Na_2O 0.16 (0.24), K_2O 4.78 (4.44), Li_2O 0.06 (—), $\text{H}_2\text{O} +$ 5.78 (5.90), $\text{H}_2\text{O} -$ 4.74 (5.95), CO_2 0.02 (—), P_2O_5 nil (trace), totals 99.73 (100.04), sp.gr. 2.63 (2.63). Information is given for prospectors and for the mining and preparation of mica for market.

L. J. S.

CHOWDHURY (Ramani Ranjan). *The uses and applications of sheet and waste mica*. Bull. Geol. Mining Metall. Soc. India, 1939, no. 3, 20 pp. Price 2 rupees.

An enumeration of the many uses of mica for electrical and heat insulation, as a filling material, and for various decorative purposes, &c.

L. J. S.

MACGREGOR (M.). *Synopsis of the mineral resources of Scotland*. Special Reports of the Mineral Resources of Great Britain. Geol. Surv., 1940, vol. 33, 59 pp., 1 fig. Price 1s.

Information, collected from scattered sources, is given of the nature, distribution, and uses of various economic minerals—coal, oil-shale, ores of Fe, Pb, Zn, &c., building stones, sand, clay, baryte, diatomite, gemstones, &c.

L. J. S.

Miscellaneous.

THOREAU (J.), BRECKPOT (R.), & VAES (J.-F.). *La monazite de Shinkolobwe (Katanga)*. Bull. Acad. Roy. Belg., 1936, ser. 5, vol. 22, pp. 1111–1122, 2 figs.

The monazite (P_2O_5 24·90, CeO_2 32·29, La_2O_3 &c. 41·83, CaO 0·37, SiO_2 0·95, MgO and Fe_2O_3 traces, total 100·34) had α 1·79, γ 1·84, $2V$ 13–16°, positive, and develops the forms *v w a l m e r z* [Dana's letters]. Spectrographic examination showed the presence of traces of Mo, Ni, Co, Fe, Ti, Pb, Mg, Ca, and B, while spectrographic examination of the rare-earths isolated from the mineral showed that the ' La_2O_3 &c.' of the analysis is principally La, less Pr and Nd, about 1 % Sm, 0·1 % Gd and Th, and less Yt. A chemical test indicated 0·2 % ThO_2 . M. H. H.

MARTIN (L. O.). *Några nyfunna gadolinitkristaller från Ytterby*. Geol. För. Förh. Stockholm, 1936, vol. 58, pp. 344–348, 1 fig.

Three crystals of gadolinite from Ytterby were measured goniometrically; the forms observed were *c q w y b m a l p o* [Dana's letters]; the doubtful *d*(121) of Sjögren is confirmed, and a new form (122) recorded.

M. H. H.

WARREN (Harry V.). *A gold-bismuth occurrence in British Columbia*. Econ. Geol., 1936, vol. 31, pp. 205–211. [M.A. 7–490, 509.]

Galenobismutite (I) and cosalite (II) occur at the Cariboo gold mine, along with gold, galena, blende, pyrite, quartz, and ankerite.

		S.	Bi.	Pb.	Fe.	Cu.	Total.
I.	...	16·40	51·00	30·50	1·50	—	99·40
II.	...	16·40	39·35	41·20	—	3·60	100·55

M. H. H.

[PILIPENKO (P. P.)] Пилипенко (П. П.). К вопросу о структуре и химическом составе глауконита.—PILIPENKO (P. P.). *On the problem of structure and chemical composition of glauconite*. Bull. Soc. Nat. Moscou, 1935, new ser., vol. 43, sect. géol. vol. 13, pp. 155–169 (Russian), 170–171 (English résumé).

An occurrence of glauconite in the Crimea is described, with analysis. Glauconite consists of a mixture of opaline silica, $2\text{SiO}_2 \cdot \text{H}_2\text{O}$, with an acid aluminium ferrate $2\text{R}_2'''\text{O}_3 \cdot p\text{R}'_2\text{O}$, where $\text{R}''' = \text{Al}, \text{Fe}'''$, $\text{R}' = \text{H}, \text{Li}, \text{Na}, \text{K}, \text{Mg}, \text{Ca}, \text{Fe}''$, and $p = 2, 3$, or 4 .
M. H. H.

PELLOUX (A.). *Sulla scheelite delle miniere del Gerrei in Sardegna*. Atti (Rend.) R. Accad. Lincei, Cl. Sci. fis. mat. nat., Roma, 1935, ser. 6, vol. 22, pp. 554–556.

Crystallographic description; the forms observed are, in order of importance, p, e, h, s, g, c [Dana's letters]. The mention of Su Suergiu mine, Gerrei, Sardinia, as a locality for cuproscheelite (Hintze, Handb. Min.) is an error due to a misprint (CuO for CaO), the mineral being scheelite.
M. H. H.

[BOROVSKY (I. B.) & BLOKHIN (M. A.)] Боровский (И. Б.) и Блохин (М. А.). Определение гафния в циркониевых минералах Союза.—BOROVSKY (I. B.) & BLOCHIN (M. A.). *Definition of hafnium in zirconium minerals of the USSR*. Изв. Акад. Наук, Сер. Геол. (Bull. Acad. Sci. URSS, Sér. Géol.), 1937, pp. 185–192 (Russian), 192–193 (English summary), 1 fig.

The Hf percentage and Hf/Zr ratio were determined by X-ray spectrography for several specimens of zircon, catapleiite, eudialyte, and eucolite; the Hf/Zr ratio varied from 0.015 to 0.03 and is highest in the zircons; Sr, Yt, Nb, Ta, and Th are also always present, Yt, Sr, and Ta mostly in the eudialytes, Sr and Th in the zircons. A variety of titanium minerals contained Ta and Nb, with an average Ta/Nb ratio of 0.04, while in cassiterites the ratio was near unity. [M.A. 7–215.]
M. H. H.

BRADLEY (A. J.) & GOLDSCHMIDT (H. J.). *An X-ray investigation of the iron-rich nickel-iron alloys*. Journ. Iron & Steel Inst. London, 1939, vol. 140 (no. 2 for 1939), pp. 11P–27P, 1 fig.

An X-ray investigation of the system Fe–Ni reveals three phases: α [kamacite]; γ [taenite]; and α_1 which is a low-temperature body-centred phase with a composition near Fe_3Ni existing only below 350°C . Above 580°C . the two-phase gap between α and γ is quite

narrow, broadening suddenly at 580° C., and changing little down to 350° C.; over this intermediate range two-phase structures are formed between about 7 and 25 % Ni. Below 350° C. the α_1 phase appears; owing to the similarity of the α and α_1 phases, the $\alpha + \alpha_1$ cannot be directly explored; the $\alpha_1 + \gamma$ region ranges from about 25 to 40 % Ni at 325° C. Non-equilibrium states are also discussed. [M.A. 7-372, 537.]

M. H. H.

BIRCH (Francis). *The alpha-gamma transformation of iron at high pressures, and the problem of the earth's magnetism.* Amer. Journ. Sci., 1940, vol. 238, pp. 192-211, 6 figs.

The change of the α - γ transition temperature of iron with pressure has been determined. The results tend to show that the α -phase, which alone shows ferromagnetism, is probably confined to a thin shell near the surface of the earth, and the bearing of this on the earth's magnetism is discussed. In nickel-iron alloys the γ -phase also can be ferromagnetic, and the discussion is inconclusive, since our knowledge of the relevant properties of these alloys is inadequate.

M. H. H.

SCHOEP (A.). *Splijtingen, corrosie-figuren en monokliene symmetrie van saléiet; epitaxie op metatorberniet.* Meded. Kl. Wetens. Kon. Vlaamsche Acad. Wetens. Lett., Gent, 1939, pp. 65-70, 5 figs. (Flemish with French résumé.)

Cleavages and etch-figures on saleeite [= saleite, M.A. 5-292] from Shinkolobwe, Katanga, point to monoclinic symmetry. The perfect cleavage (010), on which face the crystals are tabular, was previously taken as (001) in the orthorhombic orientation. Other cleavages are (100), (001), and (101); twin-plane ($\bar{2}01$); optic axial plane (001). The crystals are almost always grown in parallel position on metatorbernite.

L. J. S.

JOHNSTON (R. W.) & TILLEY (C. E.). *On fluoborite from Selibin, Malaya.* Geol. Mag. Hertford, 1940, vol. 77, pp. 141-144, 1 pl.

A new analysis of the magnesium borate from the Beatrice mine [M.A. 5-63] shows the presence of much fluorine, and the mineral is identified as fluoborite [M.A. 3-110, 274]. Micro-sections show felted masses with sometimes minute hexagonal prisms; ω 1.530, ϵ 1.507. The analysis, B₂O₃ 17.67, MgO 62.02, SiO₂ 0.88, Al₂O₃ 0.92, Fe₂O₃ 0.36, FeO 1.16, CaO 0.56, F 20.94, H₂O + 3.23, H₂O - 0.03, total (less O for F) 98.95, agrees approximately with the formula 3MgO.B₂O₃.3Mg(F,OH)₂.

L. J. S.

KROUPA (Edith) & HECHT (Friedrich). *Die Bestimmung von Blei, Thorium und Uran in Allaniten zum Zweck geologischer Zeitmessung.* Zeits. Anorg. Chem., 1938, vol. 236, pp. 181–199.

A method is described for the determination of lead, uranium, and thorium in one gram of allanite. M. H. H.

ROSE (Adolphe). *Sur la dissociation thermique du carbonate de zinc.* Compt. Rend. Acad. Sci. Paris, 1939, vol. 208, pp. 1914–1916.

Smithsonite in thermal dissociation gives rise to an oriented pseudomorph of zincite in which each zincite crystal has a $m(10\bar{1}0)$ face parallel to an $e(3\bar{1}1)$ face of the smithsonite, and its $[0001]$ axis parallel to either $[112]$ or $[1\bar{1}0]$ of the smithsonite. The mechanism of the dissociation is discussed. M. H. H.

ADAMS (Thomas C.). *Recent deposition of salt from Great Salt Lake.* Journ. Geol. Chicago, 1938, vol. 46, pp. 637–646, 5 figs.

Since 1934 the Great Salt Lake, Utah, has deposited halite each summer and redissolved it in the autumn, besides the well-known winter deposition of mirabilite. M. H. H.

STRUNZ (Hugo) & SCHROETER (Joachim). *Plan einer Klassifikation der natürlichen Phosphate, Arsenate und Vanadate.* Zeits. Krist., 1939, vol. 102, pp. 71–77.

A classification of natural phosphates, arsenates, and vanadates.

F. A. B.

NOWACKI (W.). *Die Begriffe "Gestalt — Tracht — Habitus" in der Kristallmorphologie.* Zeits. Krist., 1939, vol. 102, pp. 144–145.

Special definitions of the terms 'Gestalt', 'Tracht', and 'Habitus', which have been used, sometimes synonymously, sometimes differently, for the general form and habit of crystals. F. A. B.

STOIBER (Richard E.). *Minor elements in sphalerite.* Econ. Geol., 1940, vol. 35, pp. 501–519, 6 figs.

Using a carbon arc and a 21-foot grating-spectrograph, the order of magnitude of the amounts of Cd, Mn, Ge, Ga, In, Sn, Tl, Co, Ni, Bi, Mo, As, was obtained in 75 samples of blende from various deposits formed at low, intermediate, or high temperatures. The distribution of these elements in relation to the temperature of formation of the blende and its 'metallo-genetic' type is discussed. M. A. P.

PERETTI (L.). *Il berillo di C. Mondei presso Montescheno (Val d'Ossola)*. Atti (Rend.) R. Accad. Italia [formerly Lincei], Cl. Sci. fis. mat. nat., Roma, 1939, ser. 7, vol. 1, pp. 63-66.

Beryl crystals from pegmatite show the forms *m i a c p s v*. Analysis of blue crystals with sp.gr. 2.718, ω 1.5836, ϵ 1.5772 gave SiO_2 64.95, Al_2O_3 17.24, Fe_2O_3 0.48, FeO trace, BeO 12.56, MgO 0.31, CaO 0.53, Na_2O 0.84, K_2O 0.50, Li_2O 0.13, Cs_2O , Rb_2O nil, $\text{H}_2\text{O} + 2.28 = 99.82$. Olive-grey crystals have sp.gr. 2.726, ω 1.5825, ϵ 1.5750. L. J. S.

MORGANTE (S.). *La fluorite di Corvara*. Periodico Min. Roma, 1939, vol. 10, pp. 379-396, 2 pls., 1 text-fig.

At this locality near Bolzano in Trentino [M.A. 7-107] a large vein consists mainly of granular fluorite with galena, blende, quartz, calcite, &c. Crystals in geodes show the forms *c o d e m v* [Dana's letters]. Analyses: I, of colourless; II, greenish; and III, green material.

	F.	Ca.	Mg.	Fe.	Mn.	SiO_2 .	ign.	Total	Sp. gr.	<i>n</i> .
I.	48.21	51.26	0.03	trace	nil	nil	0.18	99.68	3.184	1.4337
II.	48.29	51.24	0.03	trace	nil	0.05	0.22	99.83	3.175	1.4335
III.	48.18	51.13	0.04	0.008	trace	0.09	0.19	99.638	3.178	1.4330

L. J. S.

TOKODY (László). *Gipsz Nagybánya- és Felsőbánya-éről*.—TOKODY (L.). *Gyps von Nagybánya und Felsőbánya*. Ann. Mus. Nat. Hungarici, Min. Geol. Pal., 1939, vol. 32, pp. 12-18, 3 figs. (Hungarian with German summary.)

Three types of gypsum crystals from Nagybánya are distinguished: (1) elongated along the *c*-axis; (2) equal elongation along the *a*- and *c*-axes; (3) columnar along the *c*-axis. Crystals from Felsőbánya show the forms *b m l n* [Dana] and new $\Gamma(\bar{5}25)$. L. J. S.

MESSINA (Caterina). *I minerali di boro del granito di Baveno*. Atti Soc. Ital. Sci. Nat. Mus. Civ. Milano, 1940, vol. 79, pp. 31-48, 6 figs.

Goniometric measurements and drawings are given of crystals of datolite from the granite of Baveno. It has sp.gr. 2.989, α 1.625, β 1.648, γ 1.665, and gave analysis SiO_2 36.16, B_2O_3 22.60, Al_2O_3 0.54, Fe_2O_3 trace, CaO 35.30, H_2O 5.40, total 100.00. Tourmaline as very fine greenish-blue needles (0.01-0.2 mm. thick and up to 1 cm. long) has ω 1.668, ϵ 1.647. Black tourmaline as radial aggregates is rare; this has sp.gr. 3.170, ω 1.660, ϵ 1.636. Axinite as rosettes of small smoky-brown crystals has α' 1.674, β' 1.679, γ' 1.687. L. J. S.